Regulatory Challenges in the Phasing-Out of Persistent Organic Pollutants in Indonesia

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Abstract:

The adverse effect of Persistent Organic Pollutants (POPs) which includes endocrin disruptions, cancer, heart disease, impairment of the reproductive system, diabetes and obesity, among other, are very well documented. The Stockholm Convention on Persistent Organic Pollutants (181 state parties) restrict and eventually prohibit the production, use, emission, import and export of persistent organic pollutants.

Nevertheless, implementation of the Stockholm Convention by a country may require some adjustment in its national legal system. Indonesia has ratified the Stockholm Convention in 2009, however, its implementation has not been smooth. This article analyse Indonesia's environmental and other relevant legislation and outline the challenges that needs immediate resolution so that the Stockholm Convention can be fully implemented.

This article elaborates that there are gaps within Indonesian legal frameworks which needs to be addressed, namely: (i) redefinition and recategorization of regulated objects beyond "substances" so that it covers "articles" and "mixtures" (ii) ways to cope with growing list of POPs and (iii) gaps in the regulation of POPs life cycle, from production to import, use, registration, storage, disposal and "unintentional release" as well as (iv) the need for new environmental and product standards.

1. Introduction[1]

a. Persistent Organic Pollutants and its Dangers

Persistent Organic Pollutants (POPs) have aroused serious concern by the international community. It is believed that they pose serious harm to health and environment. POPs are organic compounds with several characters as follows[2]:

- Highly Toxics. Studies found that POPs exposures link with abnormalities in wildlife species. In people, it has been recognise that acute or chronic exposure to POPs can cause adverse health effects, including illness and death[3].
- Evaporate and high mobility. Temperature influences the movement of POPs. The process is known as "grasshopper effect" where the chemicals are

[1] This paper is developed from the authors research report: Mohamad Mova AlAfghani and Dyah Paramita, 'Polychlorinated Biphenyls (PCBs) Phasing-Out Regulation in Indonesia, Final Report' (United Nations Industrial Development Organization and the Ministry of Environment and Forestry, Republic of Indonesia 2016). The authors would like to thank Dr. Edward Nixon Pakpahan, Dr Rio Deswandi, Dr Sonny Mumbunan, the Ministry of Environment and Forestry of the Republic of Indonesia, UNIDO and Global Environmental Fund for their insight and support during the research project.

[2] *Ridding the World of POPs a Guide to the Stockholm Convention on Persistent Organic Pollutants* (United Nations Environmental Programme and the World Trade Organization 2005). p.5 http://chm.pops.int/Default.aspx?tabid=3013

[3] L Ritter and others, 'Persistent Organic Pollutants. An Assessment Report on: DDT-Aldrin-Dieldrin-Endrin-Chlordane Heptachlor-Hexachlorobenzene Mirex-Toxaphene Polychlorinated Biphenyls Dioxins and Furans' (The International Programme on Chemical Safety (IPCS) within the framework of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC)) <https://pdfs.semanticscholar.org/fdab/664fc95328458ad6a086994d86f34314bb8a.pdf> accessed 6 March 2017.

jumping around the world, evaporating in warm temperature, riding the wind and settling in cool place, vaporising and then moving on. They are travelling a long distance through different mediums such as air and water[4].

- Persistent. The chemicals last for a long time in the environment. They are resistant to environmental degradation and transferable to the next generation[5].
- Accumulate in fatty tissue. PCBs are lipid soluble it absorbed by tissue with a fat content and stick there. Due to their persistence, POPs can be accumulated in fatty tissues along the food chain and reached magnified levels at the top predators[6].

POPs have been extensively used around the world and are found in different types of industrial chemicals such as PCB transformers, flame retardants for the TV sets and computers. They also found in pesticides such as DDT to fight against malaria and to control diseases in agricultural corps and Endrin to control rodents such as mice and voles. Some of the POPs are also released *unintentionally* from industrial processes and combustion[7] for example, incineration of municipal waste and burning of trash in the backyards. Incomplete combustion release Polychlorinated dibenzo-p-dioxins (PCDD) and Polychlorinated dibenzofurans (PCDF)[8].

b. Ratifications of the Basel, Rotterdam and Stockholm (BRS) Conventions

There are three primary international legal frameworks for Persistent Organic Pollutants (POPs): the Basel 1989 Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal ("Basel Convention"); The 2004 Convention on Persistent Organic Pollutants (POPs) ("Stockholm Convention) and the 1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade ("Rotterdam Convention"), they will be referred jointly in this article as the "BRS Convention". Indonesia has ratified the BRS Conventions.[9]

Two Conventions, the Basel and the Rotterdam, focused on the transboundary movement of hazardous substances. While the Basel Convention aims to control the movement of hazardous wastes in general, the Rotterdam Convention deals with "prior informed consent" in the importation and exportation of hazardous substances, including POPs. The Stockholm Convention on the other hand, outlines the general legal framework on POPs, focusing on its restriction, prohibition from use, its phasing-out and disposal. As such, the Stockholm Convention deals directly with the internal law of ratifying countries as it requires significant adjustment in each state party's institutional and regulatory framework in order to be implemented.

[4] *Ridding the World of POPs a Guide to the Stockholm Convention on Persistent Organic Pollutants* (n 2)..5
[5] ibid... p.5
[6] ibid.p.5
[7] ibid.p.6
[8] 'The 12 Initial POPs' <http://chm.pops.int/TheConvention/ThePOPs/The12InitialPOPs/tabid/296/Default.aspx> accessed 6 March 2017.
[9] Indonesia has ratified Basel Convention through Presidential Decree No. 61/1993 on Basel Convention Ratification and the Presidential Regulation No. 47/2005 on the Ratification of the Amendment of Basel Convention; Stockholm Convention is ratified through Law No. 19 of 2009.; and the Rotterdam Convention is ratified through Law No. 10/2013.[9]

The Stockholm Conventions lists down 12 chemicals, known as "dirty dozen" which were initially identified by the convention for eventual elimination.[10] The chemicals are categorised in three groups namely chemicals for elimination[11] (listed in Annex A of the Convention), chemicals for restricted use[12] (listed in Annex B) and unintentionally produced chemicals[13] (listed in Annex C). However, the list of chemicals kept growing[14] – the addition of which must follow the Stockholm's procedures for the proposal, adoption and entry into force of additional annexes -- and thus, once agreed, may require state parties to adjust to the most recent amendment[15]

c. Indonesia's Plan to Implement the Stockholm Convention

There are different deadlines and treatments for the chemicals listed in the Convention. Polychlorinated biphenyls (PCBs) – which are often found in electrical equipment such as transformers and capacitors must be eliminated *from use* (and production) by 2025.[16] The 2014 NIP reported that there are 22,878 tonnes of dialectric oils contaminated with PCB, 14,967 tonnes of which are inside equipment owned by The State Electricity Company (PLN).[17]

By the above 2025 deadline, the Stockholm Convention only prohibits *the use* of PCBs in those equipment, but does not specifically require it to be directly disposed. Between today and 2025, the Stockholm Convention still allow for the equipment to be used, but prohibits such use in equipment associated with the production of food or feed[18] and

[10] The 12 Initial POPs Under the Stockholm Convention, http://chm.pops.int/TheConvention/ThePOPs/The12InitialPOPs/tabid/296/Default.aspx

[11] Aldrin, Dieldrin, Chlordane, Toxapphene, Mirex, Endrin, Hexachlorobenzene, Heptachlor, Polychlorinated Biphenyls/PCB)

[12] Dichloro Diphenyl Trichloroethane (DDT)

[13]Polychlorinated dibenzo-p-dioxins (PCDD), Dibenzofurans (PCDF), Hexachlorbenzene, Polychlorinated Biphenyls (PCBs)

[14] The Annexes A, B, and C of the convention have been amended several times. The current amandement was made in 2015. The additional POPs are: Alpha hexachlorocyclohexane, Beta Hexachlorocyclohexane, Chlordecone, Hexabromobiphenyl, Hexabromodiphenyl ether and Heptabromodiphenyl ether, Lindane, Pentachlorobenzene,perfluorooctane sulfinic acid, its salt and Perfluorooctane sulfonyl fluoride, Tetrabromodiphenyl ether, Pentabromodiphenyl ether, technical Endosulfan and its related isomers, hexabromocyclododecane (HBCD), Hexachlorobutadiene, Pentachlorophenol and its salts and esters, Polychlorinated naphthalenes. 'Text of the Convention' <http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx> accessed 6 March 2017.

[15] Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001).Article 22

[16] ADDIN ZOTERO_ITEM CSL_CITATION {"citationID":"ft9prBXm","properties":{"formattedCitation":"Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup.","plainCitation":"Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup."},"citationItems":[{"id":6805,"uris":["http://zotero.org/users/9356/items/ANA7V7BV"],"uri":["http://zotero.org/users/9356/items/ANA7V7BV"],"itemData":{"id":6805,"type":"legislation","title":"Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup","shortTitle":"Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup"}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup.ibid.Annex A Part II

[17] 'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (Republik Indonesia 2014).page v

[18] Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15). part II note b (ii)

require that safety measures be in place when such equipment are used in populated areas such as schools and hospitals.[19]

DDT (1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane) – a pesticide -- can still be produced and used, but in a very restrictive terms, for example, for disease vector control (such as, to control malaria[20]) provided that there are no viable alternative and in accordance with WHO recommendation .[21] Other chemicals in the "dirty dozens" are also pesticides. Some are ectoparasiticide, Insecticide, Termiticide or as a solvent in pesticide. The Stockholm Convention require parties to develop regulatory mechanism to ensure that DDT is only used for disease vector control and to implement and develop suitable alternative products.[22]

In Indonesia, pesticides containing active substance/additive that are considered as POPs based on Stockholm Convention, are classified as forbidden pesticides regulated by the Ministry of Farming[23]. The list of POPs that are prohibited as "active substance" and additive in the Pesticides includes Aldrin, DDT, Dieldrin, Endrin, Heptachlor, Heptachlor benzene (HCB), Mirex, Chlordane and Toxaphane.[24]

Although DDT has been banned in the country, a high concentration of DDT's residue and its derivative are still found in the environment such as in one River in Batu, East Java and in the sediments of two rivers in West Java[25]. The 2014 NIP reported that, based on a pesticide inventory in 2013, the organochlorine pesticide compounds were registered somewhere between 1992 – 2002. However, there is no further information regarding the specific type of the pesticides found. In 2008, it was found that Endosulfan was registered[26]. Endosulfan with the trademark name Akodan (containing 20% endosulfan) can still be found in small stores. In addition, Lindane known as Gamaxene (trade name) was registered by two companies to Indonesian authority. They were imported from India[27].

Perfluorooctane sulfonic acid (PFOS), its salts, and Perfluorooctane sulfonyl fluoride (PFOSF) [28] can be produced and used for acceptable purposes (e.g. photo imaging, fire fighting foams, and hydraulic fluids)[29] and for specific exemptions (e.g. electric and electronic parts for some colour printers and colour copy machines and chemical drive oil

[19] ibid. part II note b (iii)
[20] Henk van den Berg, 'Global Status of DDT and Its Alternatives for Use in Vector Control to Prevent Disease' (2009) 117 Environmental Health Perspectives 1656.
[21] Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15). Annex B Part II
[22] ibid. Annex B Part II
[23] Article 6 (1) and (2) Peraturan Menteri Pertanian Republik Indonesia Nomor 39/Permentan/Sr.330/7/2015 Tahun 2015 Tentang Pendaftaran Pestisida.
[24] Peraturan Menteri Pertanian Republik Indonesia Nomor 39/Permentan/Sr.330/7/2015 Tahun 2015 Tentang Pendaftaran Pestisida Attachment II

[25]'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (n 17)., p.41
[26]ibid.p.33
[27] ibid. p,34
[28] Listed in Annex B in 2009 see Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15).
[29] 'Acceptable Purposes: PFOS and PFOSF' <http://chm.pops.int/Implementation/Exemptions/AcceptablePurposesPFOSandPFOSF/tabid/794/Default.aspx> accessed 6 March 2017.

production)[30]. In Indonesia, during 1999-2012, firefighting foam was the largest contributor for the amount of PFOS used (1,208,159 kg), followed by textile (874,662 kg), pulp and paper (665,440 kg), and synthetic carpet (555,233 kg). Meanwhile, based on imported goods, textile has the most contribution for PFOS (2,022,075 kg), followed by pulp and papers (1,085,742 kg), fire fighting foam (1,237,933 kg) and synthetic carpet (4,648 kg)[31]. The current regulatory framework still has not address PFOS management in detail.

In May 2009, Brominated Flame Retardants (BFRs) was added to Annex A of the Stockholm Convention. These chemicals include Hexabromobiphenyl (HBB) and two types of Polybrominated Diphenyl Ethers (PBDEs) such as OctaBDE and Deca BDE. These chemicals mixed in different articles or applied as a treatment to materials (e.g electronic, plastics, textiles, etc) to prevent fires, to limit the fire from spreading and to minimize the damage from the fire[32]. There is no information available regarding the production, import, export and the use of commercial formulation of PBDEs in Indonesia[33]. However, based on an inventory in 2013, the stockpiling of PBDEs from obsolete vehicle was approximately at 15,185 kg (tetra-BDE), 26,689 kg (penta BDE), 3, 681 kg (hexa-BDE) and 230 kg (hepta-BDE)[34]. The 2014 NIP reported that the final waste disposal sites such as Bantar Gebang, (Jakarta), Benowo (Surabaya) also e-waste and obsolete vehicle storages sites in Bekasi, Bogor and Depok are contaminated with PBDE[35]. There are no regulation or any guidance issued by the government regarding the management of PBDEs or waste containing PBDEs in Indonesia, as well as a threshold value to measure PBDEs in human and environment[36].

In terms of unintentional release of POPs categorised in Annex C of the Stockholm Convention such as Hexachlorobenzene (HCB), Polychlorinated dibenzo p-dioxins and dibenzofurans (PCDD/PCDF), as well as PCBs, the Convention prioritise the use of technology that is able to prevent the formation and release of the aforementioned chemicals.[37]. In addition, when constructing new treatment facilities, the best alternative process, techniques or practices should be prioritized in order to prevent the formation and release of the chemicals[38]. These should be applied in the process of constructing POPs waste treatment facilities as well as in any other practices that unintentionally release POPs such as thermal processes and activities, which involve incomplete combustion or chemical reactions. Some of examples of these activities includes: a) waste incinerators (e.g. municipality co-incinerators, hazardous or medical waste incinerators, b) cement kilns firing hazardous waste, c) open burning of waste, including the open burning in the landfill sites, d) residential combustions, etc[39].

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[30] 'Specific Exemptions' <http://chm.pops.int/Implementation/Exemptions/SpecificExemptions/tabid/1133/Default.aspx> accessed 6 March 2017.

[31] 'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (n 17)., p.v

[32] 'Flame Retardant Basics' <https://flameretardants.americanchemistry.com/Flame-Retardant-Basics/> accessed 6 March 2017.

[33] 'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (n 17)., p.51, 52

[34] ibid. p.50

ibid.p.51, 52

ibid. p.52

[37] Annex C, V. A (d) Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15).

[38] Annex Part V B (b) ibid.

[39] Annex C Part II and III Stockholm Convention

GR No. 74/2001 on Hazardous and Toxic Substances have not address the concern of Annex C (unintentional release of POPs). There is no inventory yet regarding the mass concentration of PCDDs/Fs, and PCBs. It is suspected that power plants (e.g Suralaya power plant, West Java) and waste incinerators in the country released such chemicals.[40]

The 2008 NIPs outline that Indonesia planned to, among other, establish a Hazardous Substances Committee (Komite B3); conduct capacity building; control the distribution of POPs pesticides; conduct inventory for PCB and HBCD; review law and regulations especially by regulating the use of transformers, capacitor, and other articles suspected to contain PCBs by labelling them with information of the electrical medium, improve regulations concerning PCBs elimination and control the distribution of illegal POPs and pesticides.[41] "Regulatory strengthening measures" are once again stressed in the 2014 NIPs. The 2014 NIPs even acknowledge that existing regulatory frameworks are inadequate in order to fully implement the Stockholm Convention. The 2014 outlined that the government have planned to evaluate and harmonize "…*all regulations related to the management of hazardous substances and hazardous wastes in Indonesia, which are linked to POPs listed in the Stockholm Convention…*" and "…*ensure that their management and regulation throughout their life cycle are obligatory covered*".[42]

The 2008 and 2004 National Implementation Plans and the Basel, Rotterdam and Stockholm Conventions thus require the Indonesian Government to conduct various regulatory reforms. Furthermore, from the viewpoint of Indonesia's regulatory system, ratifications of international conventions (such as the Stockholm Convention) into Indonesia's primary legislation (*Undang-Undang*) alone, is not a sufficient guarantee of implementation. In order to be implemented, the *Undang-Undang* must further be enumerated into implementing regulations (*Peraturan Pelaksanaan*), which could take the form of a Government Regulation, Presidential Regulation, down to the ministerial regulations.

This does not necessary means that new implementing regulations must be created every time a Convention is ratified. It may be sufficient that existing implementing regulations be evaluated and benchmarked against the Convention's requirements and is then modified or amended when required.

d. Legal Consequences of "Phasing-Out"

The term "phase-out" or "phasing-out" are only mentioned several times in the Stockholm Convention, although implementation of the Convention, to many extent, depends on phasing out activities. Phasing Out is mentioned in Article 13(7) of the Stockholm Convention: "…*keeping in mind that the phasing out of persistent organic pollutants might require sustained funding*…" and also used in the context of PFOS under Annex B (Restriction) part 3: "…*to take action to phase out uses*…".

[40]'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (n 17)., p. 78,128

[41] 'National Implementation Plan on Elimination and Reduction of Persistent Organic Pollutants in Indonesia' (2008).

[42] 'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (n 17).

The term phasing-out however, carries important ramifications. Our research reveals that in practice, phasing out has three types of major deadlines: deadline for use (the extent for which such chemicals or equipment can still be used), deadline for storage (the extent of which such chemicals can remain is stockpile) and the deadline for disposal (the ultimate deadline in which all inventoried chemicals should be processed for treatment).[43] Each of these deadlines are very important as they should be aligned with each state's capacity in terms of the technical readiness to construct and operate a facility, train human resources for accident prevention and the staging of incentives with respect to the passing of each deadlines.

The four legal consequences of phasing out are as follows.

First, phasing out entails the transitional arrangement for POPs which are still in use. An example of this is PCBs, which, as discussed previously, can still be used until 2025.[44] This entails that there are transformer, capacitors and other electrical equipment, which uses PCB that are still operational . In developing or underdeveloped countries or regions, often time the cost for replacing such equipment are considered too high. "Phasing-out" would enable them to utilize the remaining life-time of such equipment or until 2025 and prepare for its replacement.

However, if such equipment explodes, leak or damage, contamination might occur. The Stockholm Convention require that proper care is exercised in cases where such equipment is located on highly populated areas, schools, hospitals and not to use them in areas related to the production of food or feed.[45] What this means is that national law shall prescribe prohibition and restriction on the placement of such equipment.

Secondly, Phasing-Out entails the requirement to build an environmentally sound disposal infrastructure. The Stockholm Convention obligates contracting party to reduce or eliminate releases from unintentional production[46]. This, however, is not understood in strict terms. Annex C, Part V B (b) states that when constructing such facilities, "…***priority consideration*** *should be given to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of such chemicals*".[47]

The Best "Available" Technology for disposal under the Stockholm Convention is thus, best understood in relation to the capacity and capability of each state. That said, an obligation to construct best technology that would prevent "unintentional release" arises in conjunction with State's capacity and capability.

In practice, technologies which can eliminate unintentional release have been associated with non-combustion technologies.[48] Thus, while combustion technologies are typically

[43] AlAfghani and Paramita (n 1).
[44] ibid.
[45] Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15). Annex A Part II
[46] ibid. Article 5
[47] ibid.
[48] Ellen Rubin and Younus Burhan, 'Noncombustion Technologies for Remediation of Persistent Organic Pollutants in Stockpiles and Soil' (2006) 16 REM Remediation Journal 23; United States., Environmental Protection Agency. and Office of Solid Waste and Emergency Response., *Reference Guide to Non-Combustion Technologies for Remediation of Persistent Organic Pollutants in Stockpiles and Soil* (US Environmental Protection Agency, Solid Waste and Emergency Response

more ubiquitous, non-combustion technologies needs to be procured, constructed or imported. In the case of Indonesia, for PCB, such non-combustion technology is currently non-existent. However, Indonesia have signed a memorandum with UNIDO (United Nations Industrial Development Organisations) and GEF (Global Environment Fund) which enables it to access GEF funding for disposal facilities.[49] With this condition, such technology becomes "available" for Indonesia and thus, the international obligation to dispose POPs using such technology might arise.

Thirdly, while waiting for disposal facilities to be constructed, POPs waste would probably remain in stockpile, except in cases where waste owners prefers to absorb the very high cost of exporting such waste to overseas facilities. As the 2014 NIP shows, for Indonesia, most of the PCB waste remains with the owner's stockpile.[50] The longer hazardous chemicals stored in stockpile, the higher its contamination risk as accidents – either due to natural or human causes might occur. If such wastes remain in its owners' storage, the strict liability nature of such wastes remain with its owners. In this sense, "phasing-out" may actually require the regulatory framework to allow trade-off between risk of contamination versus high cost of exporting such waste to facilities abroad.

Fourth and finally, the term "phasing out" may require a form of staging for incentive regulation. As will be discussed in other part of this article, regulatory framework often design sanctioning mechanism as an outright-ban, that is to say, to directly prohibit and sanctions on all utilization or possession of such banned chemicals. For some type of POPs, an outright-ban may produce unintended consequences, such as the dumping of such chemicals to waterbody (if they are in stockpile), in order to avoid harsh punishment or expensive disposal costs or alternatively, it may prevent owners from declaring its possession of POPs.

In this respect, the government's interest is to have all "phased out" chemicals to be revealed by its owners, inventoried and properly labelled and registered. There are instances where command and control regulation (revocation of licences, criminal sanctions) should be employed only at the passing of such deadlines mentioned earlier. Thus, owners who reveal that they utilize POPs (within the phasing-out deadline for use) should not have been punished. Only when the deadline for declaration of ownership has been lapsed should the government impose some types of penalties. Such staging of incentives can also be implemented in conjunction with the deadline for storage and the deadline for termination. These types of incentive regulation would require some adjustment in Indonesia's regulatory framework.

e. **Indonesia's Regulatory Frameworks still needs adjustments**

Our research concludes that in order to effectively monitor, phase-out and dispose Persistent Organic Pollutants in Indonesia, existing regulatory frameworks is not sufficient

2005); Kåre Helge Karstensen and others, 'Test Burn with PCB–oil in a Local Cement Kiln in Sri Lanka' (2010) 78 Chemosphere 717; Roland Weber, 'Relevance of PCDD/PCDF Formation for the Evaluation of POPs Destruction Technologies–review on Current Status and Assessment Gaps' (2007) 67 Chemosphere S109.

[49] AlAfghani and Paramita (n 1).

[50] 'Penelaahan Dan Pemutakhiran Rencana Penerapan Nasional Konvensi Stockholm Tentang Bahan Pencemar Organic Yang Persisten Di Indonesia, Kementerian Lingkungan Hidup Indonesia' (n 17).

and therefore would require modifications and amendments. The modifications and amendments must at least, be able to address four issues: (a) definition and distinction between the concepts of "Substance, Mixture and Articles", (b) mechanism to cope with the growing list of Persistent Organic Pollutants, (c) addressing gaps in the environmentally sound management life cycle of POPs, (d) insertion of sanctioning mechanisms, and e) harmonising policies among different authorities (Ministry). Each of these will be discussed below.

2. Lack of Distinction between "Substance, Mixture and Articles"

There are two main regulations concerning hazardous chemicals in Indonesia, both takes the form of Government Regulations which implements the Indonesian Environmental Law. The first is Government Regulation 101 on The Management of Wastes of Hazardous, Dangerous and Toxic Substances ("GR 101") and the second is Government Regulation 74 Year 2001 on the Management of Hazardous, Dangerous and Toxic Substances ("GR 74").

Legislation does not define "substance", but it provides definition of "Hazardous, Dangerous and Toxic Substances" or known in Indonesia as "*Bahan Berbahaya dan Beracun* or B3". The Environmental Law for example, define B3 as "…*substances* (zat)*, energy or other components which, due to their nature, concentration or amount, directly or indirectly, can contaminate or damage the environment, health or the survival of mankind and other organisms*".[51] This definition is reiterated by GR 101, whereas, GR 74's definition of B3 is much narrower as it does not include "energy or other component" but only "substance".

The categories of "zat" (substance) "energy" and "other components" appears to be developed from the definition of "carrying capacity" and "contamination". The Environmental Law define "carrying capacity" as the ability of the environment to absorb substance, energy and other components – and in relation to that, defines "contamination" as the entrance of living organisms, substance, energy and other components into the environment which supersedes allowed environmental standards.[52]

Such definition may be adequate to categorize a violation once a contamination has occurred (*ex post*) but inadequate in preventing such contamination (*ex ante)*. This is because hazardous chemicals take several forms and not "substance" alone.

For example, Polychlorinated Biphenyls (PCBs), which, due to their resistance to heat and stability are often used in electrical equipment such as transformers, capacitors, cable coating and fire-retardant paints. It is inevitable for the regulatory frameworks to address the operation, storage, handling and transportation of transformers and capacitors.

Another example is PBDEs. It has been extensively use in electrical and electronic equipment (EEE) such as computer monitors, CRT (Cathode Ray Tube) and TV (television) as flame-retardants making it difficult to be categorized as "substance".

[51] Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup.
[52] ibid.

At the moment, there is no adequate legal basis for regulating the handling, storage, placement and transportation of transformers and capacitors as the Environmental Law is only focused on "substance".

There is no regulation for handling the waste of articles containing POPs or contaminated with POPs, particularly the waste of electrical and electronic equipment (E-waste). The e-waste management is not yet a concern of Indonesian legislators although the problems from e-waste will certainly arise due to raising consumption of electronic goods. The attachment of GR No. 101/2014 on Hazardous and Toxic Waste already categorises several e-waste (e.g printed circuit board, cathod ray tube, fluorescent lamp, etc) as B3 waste from common specific source[53]. Nevertheless, there is no technical guideline regarding the treatment of such wastes. in general e-waste is still handled in a traditional way. The wastes are dumped at the final disposal altogether with another type of waste, recycled by informal sector, or burned.

Another complication that could arise is in the restriction on import as manifested in the case of PCB. GR 74 contain some prohibition of PCB from use and under no circumstances PCB oil should be imported. Nevertheless, although probably a rare occurrence, currently PCB oil can still be imported under HS Code 2710910000.[54] This probably occurred to due to lack of coordination between relevant ministries.

In most situation, it is the transformers, capacitors, cables or other electrical equipment – which contain PCB – are the ones being imported, despite the prohibition from use. This can cause legal challenges if brought before a Court.

If a case is lodged to a court, it would be possible for the defendants to argue that they merely imports transformers – which is *per se* – legal. In other cases, users may refuse to comply with legal requirements with respect to placement, handling and storage of transformers containing PCB, using the same argument as those electrical equipment (transformers or capacitors) are not regarded as "PCB".

Modern chemicals legislation distinguishes between substance, mixture and article. EU's REACH for example, define substance as "*…chemical element and its compounds in the natural state or obtained by any manufacturing process…* whereas mixture is defined as solution composed of two or more substances and an article as "*…an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition*…"[55]

The Swedish Chemical Agency (Kemikalieinspektionen/KEMI) provides example that a plastic glanular material that is used in the manufacturing industry as a raw material, is considered as a chemical. However, if the glanular is made into an object made of plastic (e.g a plastic toy), the object is an "article", thus the rules of chemicals are no longer

[53] Peraturan Pemerintah Republik Indonesia Nomor 101 Tahun 2014 Tentang Pengelolaan Limbah Bahan Berbahaya Dan Beracun. See Attachment

[54] Attachment II, Chapter 27 Article 3 of Peraturan Menteri Keuangan Republik Indonesia Nomor 213/PMK.011/2011 Tahun 2011 Tentang Penetapan Sistem Klasifikasi Barang Dan Pembebanan Tarif Bea Masuk Atas Barang Impor.

[55] Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, OJ L 396, 30.12.2006, p. 1. Articles 3.1, 3.2, 3.3

applicable for the article[56]. Unfortunately, in Indonesia, PCBs contained in electrical equipment cannot be directly regulated under existing regulations which are focused on substances.

In practice, the Indonesian Ministry of Environment tends to regard existing regulation as "sufficient". They consider that any materials, to the extent that it contains B3 (hazardous and toxic substances) – should be treated as B3.[57] This stance require the definition of B3 to be interpreted extensively so as to encompass not only substances, but also mixture and articles. However, it is not likely that Courts will accept this interpretation as most judges tends to interpret narrowly in accordance with the language of the law.[58] In order to implement the Stockholm Convention, regulatory frameworks, especially GR 74/2001 (on the Management of Hazardous and Toxic Substances) needs to be broadened to that it covers not only substances, but also articles and mixtures.

3. Coping with the growing list of POPs

As mentioned above, "Regulatory strengthening measures" are stressed in Indonesia's 2014 National Implementation Plan (NIP). Although the 2014 NIP mentions that GR 74 are being revised, it acknowledges that "…*some of the newly listed POPs have not been covered by those regulations, …. This reflects that the Law No. 19 of 2009 concerning the Ratification of the Stockholm Convention has not been fully considered in the preparation of the regulation…".*

Most of POPs listed in the original Stockholm Convention have been incorporated in GR 74.[59] However, list of chemicals under Annex C of the Stockholm Convention (chemicals which are unintentionally produced) have not been included. This is because GR 74 was enacted in 2001 while the Stockholm Convention was ratified in 2009.[60] Currently, new chemicals are being assessed by the POP Review Committee for inclusion in the Stockholm Convention.[61] In the future, the list of POPs to be eliminated and restricted will inevitably grow. How can these new POPs be included in Indonesia's regulation?

At the moment, the list of POPs is regulated through the attachment of GR 74.[62] The attachment could be amended, through a proposal from the B3 Commission[63] – which are tasked with assisting the government on the management of hazardous chemicals.

[56]'Rules on Chemicals in the Life-Cycle of Articles – a Legal Analysis' (Swedish Chemicals Agency 2014) <https://www.kemi.se/global/rapporter/2014/rapport-3-14.pdf>., p. 20

[57] AlAfghani and Paramita (n 1).

[58] Muhammad Nur, 'Pengaruh Aliran Legisme Dalam Putusan Hakim Di Indonesia (The Influence of Positivism Thought in Judge's Decision in Indonesia)' (2013) 2 Jurnal Nanggroe <http://nanggroe.unimal.ac.id/index.php/nanggroe/article/view/6> accessed 15 March 2017.

[59] Peraturan Pemerintah Republik Indonesia Nomor 74 Tahun 2001 Tentang Pengelolaan Bahan Berbahaya Dan Beracun. See Attachment

[60] Undang-Undang Republik Indonesia Nomor 19 Tahun 2009 Tentang Pengesahan Stockholm Convention on Persistent Organic Pollutants (konvensi Stockholm Tentang Bahan Pencemar Organik Yang Persisten).

[61] 'About Persistent Organic Pollutants Review Committee - POPRC Overview' <http://chm.pops.int/Default.aspx?tabid=2806> accessed 15 March 2017.

[62] Peraturan Pemerintah Republik Indonesia Nomor 74 Tahun 2001 Tentang Pengelolaan Bahan Berbahaya Dan Beracun (n 59). Article 5(3)

[63] ibid. Aerticle 9 (5)

Nevertheless, 16 years after GR 74 was enacted, the B3 Commission has not been operationalised.

Furthermore, even if the B3 Commission can be operationalised, changes to the list of POPs will require GR 74 amended through a new GR. Since a GR is quite high in the hierarchy of regulation, the process would be cumbersome and would involve highly bureaucratic procedures.

For *Limbah B3* (waste of hazardous and toxic substances or "B3 waste"), GR 101 authorizes the Minister of Environment and Forestry ("Minister") to directly add new wastes into the list of B3 waste categories, without the need of amending GR 101. However, this authority can only be exercised following a "characteristic study" of the proposed waste, by the Minister. The study is meant to determine, among other, the toxicology, reactivity, corrosiveness of the proposed B3 wastes.[64] After such test, the Minister must order an evaluation to the B3 waste expert team (some kind of B3 commission, but for B3 *wastes*). Following coordination meetings, the Minister shall enact the category of the said waste. GR 101 did not stipulate the level of regulation that should be used by the Minister in determining the waste category, but presumably, it should be stipulated through a Ministerial Regulation.

Although much better than the GR 74 counterpart, GR 101 still lacks practicality with respect to wastes which have been internationally recognized as hazardous chemicals. It would be a waste of resources and an unnecessary bureaucratic burden, for example, if new list of POPs which have been designated officially by the POP review committee and adopted as an Annex of the Stockholm Convention, to be re-tested and re-evaluated in Indonesia to determine its toxicity, reactivity, etc.

In response to the above, we consider that new list of POPs which has been officially adopted by the Stockholm Convention, should be able to be immediately transposed into Indonesian Law through a Ministerial Regulation, without further bureaucratic impediments. For this to be materialized, it is sufficient that both GR 74 and GR 101 to be amended to directly authorizes the Minister to insert the new list of POPs or that a new Presidential Regulation be issued to implement Law 19 Year 2019 on the Ratification of the Stockholm Convention – and authorizes the Minister to include new list of POPs.

4. Gaps in the regulation of POPs life cycle

As told above, the Stockholm Convention still allow *some* POPs to be used until a certain date. To that extent, to be environmentally "sound", regulatory frameworks may need to consider the complete life-cycle of POPs; from importation, export and production; to distribution; registration; packaging; labelling, storage, collection; transportation; disposal and reuse; accident and emergency measures as well as occupational health and safety measures. This life-cycle analysis needs to be read in light of the strict distinction between "hazardous and toxic substance" – regulated under GR 74 and "the waste of hazardous and toxic substance" – regulated under GR 101.

[64] Peraturan Pemerintah Republik Indonesia Nomor 101 Tahun 2014 Tentang Pengelolaan Limbah Bahan Berbahaya Dan Beracun (n 53). Article 5

a. Production and Import

The general prohibition of import for hazardous and toxic substances is contained in the Environmental Law 32/2009 and for pesticides, are contained also in Law No. No.12/1992 regarding Plants Cultivation. Thus for pesticides, law enforcement agencies can enforce either the Environmental Law or the Plant Cultivation Law.

Law No. No.12/1992 regarding Plants Cultivation (*Budi Daya Tanaman*) contain provisions penalizing the distribution of and the failure to terminate forbidden pestisides.[65] The government conducts the registration, distribution and use of pesticides, determines which pesticides can be imported and which ones shall not be used.[66] Interestingly, there are no provisions penalizing the *use* of forbidden pesticides.

For POPs in general, the Environmental Law (Law 32/2009)[67] is the umbrella regulation. The term used there is to "insert" (*memasukkan*). The law says: "*Everyone is prohibited from "inserting" (memasukkan) B3 that is forbidden to be used*". This term under Bahasa Indonesia is sufficient to cover both legal and illegal importation of goods as well as other means of inserting goods to Indonesian territorry. DDT, PCBs and Dieldrin are among those substances prohibited to be inserted.[68] This provision entails imprisonment (minimum 5 years and maximum 15 years), and fines of minimum Rp. 5,000,000,000 and maximum Rp. 15,000,000,000

The prohibition of import is also outlined in GR 74/2001 on Hazardous and Toxic Substances. To note, although GR 74 was a secondary legislation which should implement the Environmental Law 32 of 2009, GR 74 was enacted in 2001. As a result, some of its provision might be outdated. GR 74 does not define what "forbidden to be used" means. It only stipulates that a B3 that is forbidden to be used means the type of B3 that is forbidden to be used, produced, distributed or imported[69].

Local production of POPs is not legally possible since Indonesia's Negative List of Investment specifically declares DDT, Aldrin, Endrin, Dieldrin, Chlordane, Heptachlor, Mirex, Toxaphene, Polychlorinated biphenyl/PCB and Hexachlorobenzene, as business fields that are closed for investment.[70]

Nevertheless, some POPs and consumer products containing POPs are in fact, still allowed to be imported. The ministry of Finance regulates the import tariff for HS Code[71] 2710910000 and 3824820000 which is a designation for mixtures containing PCB, PCT or PBB at 0% and 5%, respectively.[72] Furthermore, the Indonesian Statistics Bureau noted that as of January-February

[65] Undang-Undang Republik Indonesia Nomor 12 Tahun 1992 Tentang Sistem Budidaya Tanaman. Article 60

[66] ibid. Articles 38-40

[67] Article 69 (1) b Environmental Protection and Management Act

[68] Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup (n 51). See elucidation

[69] Article 1 number 10 GR No. 74/2001

[70] Peraturan Presiden Republik Indonesia Nomor 44 Tahun 2016 Tentang Daftar Bidang Usaha Yang Tertutup Dan Bidang Usaha Yang Terbuka Dengan Persyaratan Di Bidang Penanaman Modal. See Attachment I

[71] The Harmonised System (HS) code is a nomenclature for international product. It is developed by the World Customs Organisation (WCO). There are at least 200 countries using the system as a reference for their customs tariff policy and to collect information regarding the international trade statistic

[72] Peraturan Menteri Keuangan Republik Indonesia Nomor 213/PMK.011/2011 Tahun 2011 Tentang Penetapan Sistem Klasifikasi Barang Dan Pembebanan Tarif Bea Masuk Atas Barang Impor (n 33). See attachment of this decree

2015, for HS Code 2710910000 (Waste oil, containing PCBs, PCTs or PBBs) there has been 654 kg of import, whereas for HS Code 3824820000 (Mix and preparation containing pbbs, PCBs, PCTs), 5121 kg has been imported.[73] In other case, certain types of Polybrominated Diphenyl Ethers (PBDEs) known as flame retardants were found in the children toys such as plastic toy cubes, plastic hairpins, hand bands and etc) from recycled e-waste. These toys are freely distributed in Indonesia. Based on the 47 collected samples, 85% were containing OctaBDE with concentration about 1-108 ppm, and 89% were containing DecaBDE with concentration between 1-293 ppm.[74]

The above facts demonstrates that custom officials may not be aware on the prohibition of POPs or that they are not aware that the materials being imported are actually prohibited POPs. In addition, Indonesia does not have standard for POP Free products that can be imported and/or used. In this case, the authority cannot control articles containing POPs distributed in Indonesia. In addition, the producers does not have a guideline regarding the concentration of POPs that are allowed and/or not allowed in a consumer product. As such, coordination must be improved by issuing sectoral regulations which refers to latest list of POPs and that a compulsory standard regarding free POPs products must also be issued to protect public health.

b. Use

Although the law prohibit importation, neither the Environmental Law nor GR 74 provide sanctions for those who use and/or possess prohibited B3 (including POPs – pesticide is an exclusion to this, as discussed above). This means that any phasing-out stages which sets the deadline for usage will not never be effective since the government cannot employ any sanction to those violates such deadline. This lack of sanctioning mechanism will hamper any phasing-out effort which purport to end POPs from utilization. POPs owners will not face any legal threats to the extent that their chemicals remain in usage (i.e. not categorized as "waste").

In other countries, the utilization of POPs after the deadline for use may constitute a criminal offence. For example, in South Africa, those who still use PCB after the deadline for use are liable to R10 million or to imprisonment for a period not exceeding 10 years.[75]

Under the Stockholm Convention states may choose to limit the use of POPs for research or analysis.[76] The New Zealand's Hazardous Substances and New Organisms (Stockholm Convention) Amendment Act 2003 tightly restrict the use of POPs for research or analysis and contain provisions concerning offences, in situations where utilization of POPs are conducted in manner in contravention with such Act.[77]

If Indonesia would like to criminalize the use of prohibited POPs, then it would not be sufficient to amend GR-74. Criminalization would need to be conducted through the primary legislation. In this case, The Environmental Law No 32 Year 2009 would need to be amended.

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[73] 'Foreign Trade Statistical Bulletin: Imports, February 2015' (Badan Pusat Statistik) Katalog BPS: 8202006.

[74] 'Siaran Pers: Bahan Kimia Berbahaya Dari Sampah Elektronik (E Waste) Ditemukan Pada Mainan Asah Otak Yang Beredar Di Pasaran Indonesia' (*balifokus*) <http://www.balifokus.asia/single-post/2016/09/01/Siaran-Pers-Bahan-Kimia-Berbahaya-dari-Sampah-Elektronik-E-Waste-Ditemukan-Pada-Mainan-Asah-Otak-yang-Beredar-di-Pasaran-Indonesia> accessed 6 March 2017.

[75] Regulations to phase-out the use of Polychlorinated Biphenyls materials and Polychlorinated Biphenyls contaminated materials under section 44(1)(aA) and (aB) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) Regulation Gazette No. 10232 Vol. 589 July 2014. See Regulation 5

[76] Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15).

[77] Hazardous Substances and New Organisms (Stockholm Convention) Amendment Act 2003 (New Zealand). s.12

c. Registration

As discussed in section 1, one of the main policy objectives in the phasing-out of POPs is to gain as much information on the distribution, amount, concentration and the condition of POPs being phased-out. As such, regulatory framework could introduce incentive by providing deadline for the declaration of POPs ownership (for POPs which can be readily identified by its owners) or by facilitating free testing for POPs which takes the form of mixture or equipment and are not readily identifiable.

GR 74 puts the obligation to register on the *importer* or *producer* of hazardous chemicals (B3), especially for B3 which are imported for the first time. [78] Such registration is conducted within the Framework of INSW (Indonesia National Single Window) at the Ministry of Environment and Forestry, enacted in 2010.[79] The INSW is a system which enables the single submission of data and information and single decision-making for custom release and clearance of cargoes.[80] The B3 electronic registration system aims to handle customs documents which relates to permitting and/or import and/or export of B3 within the framework of INSW.[81]

However, there is no obligation for *owners* to register.[82] Clearly, GR 74 (enacted in 2001) was not drafted with phasing-out of POPs or other hazardous chemicals in mind. Thus, owners of POPs which were imported before 2010 have no obligation to register their ownership. Furthermore, the B3-INSW system – if, in the future, can be sufficiently linked to the list of prohibited POPs -- will likely only capture chemicals which are imported as "substance" or "mixture" – but not chemicals which are inside of equipment or articles – or products.

GR 74 is not equipped with enforcement powers, the government have no power to compel owners of POPs to register. In Sweden, the obligation to register chemicals are strengthened by Environmental Code Chapter 29[83], which will be imposed for the delay of the submission of the report. Meanwhile, in the UK (England and Wales) holding PCB and other dangerous substances without any registration is considered an offence. In addition, supplying false, misleading or reckless information to authorities are also considered an offence.[84]

[78] Article 6(1),(2)GR No 74 Tahun 2001 Tentang Pengelolaan Bahan Berbahaya Dan Beracun also'Registrasi B3 Online Terintegrasi Insw "penerapan Registrasi B3 Online Dalam Mendukung Tata Kelola B3 Nasional"' 3. and 'Launching Aplikasi Registrasi B3 Online Pada Pekan Lingkungan Hidup Dan Kehutanan 2016, Jumat 10 Juni 2016' <http://www.menlhk.go.id/berita-106-launching-aplikasi-registrasi-b3-online-pada-pekan-lingkungan-hidup-dan-kehutanan-2016-jumat-10-juni.html> accessed 6 March 2017.

[79]Peraturan Menteri Negara Lingkungan Hidup Nomor 02 Tahun 2010 Tentang Penggunaan Sistem Elektronik Registrasi Bahan Berbahaya Dan Beracun Dalam Kerangka Indonesia National Single Window Di Kementerian Lingkungan Hidup..

[80] ibid.., Article 1 number 6

[81] ibid.., Article 2

[82] Peraturan Pemerintah Republik Indonesia Nomor 74 Tahun 2001 Tentang Pengelolaan Bahan Berbahaya Dan Beracun (n 59). Article 41 (transitionary provisions) of this regulation only obligates registration of chemicals which have not been registered but have been distributed prior to the entry into force of this regulation.

[83] http://www.notisum.se/rnp/sls/lag/19980808.htm#K29

[84] The Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000; Statutory Instruments 2000 No. 1043.

In Indonesia, criminal offences in national legislations can only be formulated through primary legislation.[85] An exception to this rule is criminal sanctions in regional by-laws, but this is limited to a 6-month imprisonment or IDR 50 million fine. Thus, in order to provide uniform rules across the country, reforms should be conducted at the national regulation not regional. In this regard, the Environmental Law must be amended to allow the government to impose penalties related to registration, whether it be the failure to register or the failure to provide correct information.

d. Storage

The regulation on waste of hazardous chemicals (GR 101) contain provision limiting the period of storage for wastes. The period of storage decreases as the amount increases. For example, for category 1 waste in which the volume is less than 50 kg per day, the limit is 180 day. However, if the volume is 50 kg per day or more, the limit is only 90 days.[86]

This provision is meant to balance the risk of contamination. As the amount of waste being stored increases, the risk of contamination increases. As such, the allowable storage period should be decreased. Wastes which have been stored for such long has to be immediately treated.[87] Failure to do so entails administrative sanctions (which takes the form of either written notice, government coercion (*paksaan pemerintah*), and the freezing of the B3 waste management license for the B3 waste storage activities)[88].

The problem with "phasing-out" of POPs is that, existing treatment facilities may not be adequate. As discussed in section 1, the Stockholm Convention require state to give priority (subject to national capacity) on alternative processes, techniques or practices which prevents the unintentional release of chemicals. In the absence of available disposal facility, POPs owners have the option to export such POPs overseas, however the cost for doing so would be high.[89] As such, one of the viable option is to keep the POPs in stockpile – notwithstanding the risk of leakage, contamination and accidents – until such facilities are constructed and operational.

The Environmental Law provides criminal sanctions (1-3 years of imprisonment) and fines (1-3 billion rupiah) for those whose activities or business result (*menghasilkan* – could also be translated as "produced") hazardous and toxic substances wastes.[90] The term *menghasilkan* (produce or result in) could be legally problematic in itself, since it signifies wastes which are product or a result of a certain activity, whereas, in many cases chemicals are not a product of an activity. It is more appropriate to say that the chemicals are the "remains" of such activities.

Aside from the debate of such terminology, the criminal sanction for not treating waste could be linked to those who surpassed the deadline for waste storage. At the

[85] Undang Undang No. 12 Tahun 2011 Tentang Pembentukan Perundang Undangan. Article 15
[86] Peraturan Pemerintah Republik Indonesia Nomor 101 Tahun 2014 Tentang Pengelolaan Limbah Bahan Berbahaya Dan Beracun (n 53). Article 28 (1)b
[87] ibid. Article 29 (2)
[88] ibid. Article 243
[89] AlAfghani and Paramita (n 1).
[90] Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup (n 51). Article 103

time of writing, the authors are not aware of such case, however, our from the discussions with government officials, they are of the opinion that it is possible that POPs owners can be prosecuted for stockpiling POPs waste beyond the allowed period.[91]

The question becomes: should the government issue a *discretion* to derogate from legislative requirements on storage time limit?

There are "for" and "against" towards government discretion.

Reasons against discretion involves four arguments.

The first argument deals with the concept of discretion under Indonesian Admnistrative Law. Under The Law on Government Administration (Law 30 Year 2014, hereinafter the "GovAdmin Law"), discretion is defined as decision or action which are taken when dealing with concrete matters.[92] The GovAdmin Law limits discretion into four possibilities (i) when laws and regulation provide options for decision or action, (ii) when laws and regulations are silent, (iii) laws and regulations are incomplete are unclear and (iv) the decision or action needs to be taken stagnation in government, for the greater good. In this case, possibilities of (i), (ii) and (iii) are closed, since GR 101 does not provide option, is not silent and very clear about the time limit.

Only (iv) becomes a possibility, nevertheless, the GovAdmin Law elucidation clarifies that government stagnation occurs, for example, in major events such as disaster or political turmoil, which renders the government to be dysfunctional. Further, the GovAdmin Law also mentioned that discretion could be rendered voidable if they are, among other, (i) not in accordance with the purpose of the authority or (ii) is against the good governance principles.[93] With these consideration a discretion -- in not pursuing enforcement of stockpiled POPs waste -- which derogates from GR 101's time period restriction may violate the GovAdminLaw.

The second argument involves the option to export the waste. Similar to the Stockholm Convention, GR 101 provides option to export the B3 waste in the event that the B3 waste producer cannot process the waste or the facility to utilise/treat/process the waste is not exist in Indonesia.[94] As previously discussed, the cost for exporting the wastes may not attainable for some owners. However, one may argue that the polluter's pays principles under Indonesian legislation[95] means that owners must bear the consequences of their wastes, at any cost.

The third argument against discretion is that the purpose of the time limit for waste storage is to reduce the risk of contamination, as discussed earlier. A discretion which countermands such time limit would mean to increase the risk of contamination.

[91] AlAfghani and Paramita (n 1).

[92] Undang Undang Republik Indonesia Nomor 30 Tahun 2014 Tentang Administrasi Pemerintahan. See Article 1 (9)

[93] ibid. See Articles 30-32

[94] Peraturan Pemerintah Republik Indonesia Nomor 101 Tahun 2014 Tentang Pengelolaan Limbah Bahan Berbahaya Dan Beracun (n 53)., Article 123 (1), (4)

[95] Undang Undang Nomor 32 Tahun 2009 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup (n 51). Article 2(j)

The fourth and final argument against discretion is the possibility for the government to bear the liability for contamination that occurs *after* the GR 101 time period elapse. The government understands that when hazardous wastes are stored, the likelihood for leakage, accident or disaster increases – hence the time period limit under GR 101. When this is derogated through a discretion, they can be regarded as accepting the risk. As such, they could be liable for their actions.

The above complications can be avoided only if regulatory frameworks (especially GR 101) allows more time period for storage, in the case of phasing out of hazardous waste. This also signifies that the regulatory framework needs to weigh the public policy objective of an ultimate disposal of hazardous wastes by allowing such time period to be relaxed and at the same time allow the state to accept (and mitigate) the risks of contamination during the extended storage period.

e. Disposal and "unintentional release"

In most situation, hazardous wastes are treated through thermal processes. However, in the case of POPs, thermal treatments may produce *unintentional releases* in which, the Stockholm Convention seeks to prevent and eliminate.

Government Regulation 101 (on the Management of Hazardous and Toxic Wastes) allows thermal process for the B3 waste, subject to emission standard, combustion efficiency and the destruction and removal efficiency (DRE). The combustion efficiency should be at least 99,99% and the DRE should be equal or more than 99,9999%[96].

These policy above need to be reviewed since, in addition to arguments discussed in section 1.c. above, Article 6 (d) ii of the Stockholm Convention[97] implies that POPs (e.g. POPs waste or waste containing POPs) should be destroyed or irreversibly transformed into non-POPs and does not pose the characteristic of POPs. In this context, it is important that the destruction method/technology being used to treat B3 waste and/or B3 waste containing POPs will not release POPs unintentionally.

Furthermore, Article 6(d) iii of the Convention[98] also prohibits the disposal of POPs through *recovery* (perolehan kembali), *recycling* (daur ulang), *reclamation, direct use* (penggunaan secara langsung) or *alternative uses* (penggunaan alternative) POPs.

The Stockholm agenda have been at odds with the current government programs in providing new energy sources. Through a Presidential Decree, the government are seeking to provide new energy sources by constructing Waste-based power plants in

[96] GR 101/2014, Article 107 (4), (5), (6),(7)

[97] The Articles states "Disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option……."

[98] The Articles states "Not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants"

7 major cities including Jakarta.[99] Fearing the consequences of thermal processes, a group of environmental Non Governmental Organizations then lodge a petition to invalidate Presidential Regulation 18 Year 2016 (PR 18) which becomes the legal basis to "accelerate" the development of these plants.[100]

The Supreme Court finally approve the petition and decided to invalidate the PR 18 under four rationales, three of which are relevant for our discussion. This includes one procedural reason and two substantive reason.[101]

The one procedural reason cited by the Supreme Court was because PR 18 provided exemption to licensing requirement, by allowing construction to take place while licensing is being processed simultaneously. According to the Supreme Court this provision is incompatible with the principles of "…*environmentally-aware, sustainable development and also incompatible with the legal framework to protect the environment which obligates environmental impact assessment before the environmental license can be approved*". Meanwhile, the substantive reasons cited by the Supreme Court was that PR 18 limits waste management into thermal technologies, in which, this violates the Law on Solid Waste Management. In addition, the Supreme Court said that "*thermal technologies can damage the health due to the residue of the combustion process as shown in evidence P27, P28, P29, P 30, P31, P32 and as such, contrary to health law"*.

As can be seen above, the strongest rationale for invalidation of the PR 18 was the exclusion to normal licensing procedures stipulated by Environmental Law – this was argued by the Supreme Court in one full page. Meanwhile, the substantive reason, the assertion that thermal processes are hazardous to health was only argued by the Supreme Court in 5 lines. Clearly, the Supreme Court was more convinced by expert opinions submitted by the petitioners and was less convinced by the arguments which suggests that thermal procedure was safe. Indeed, the government representative who defended PR 18 did not presented compelling scientific evidences on the safety of thermal processes.

5. The need for new environmental and product standards

On early March 2017, a group of male civil society activists, wearing mermaid costume, held a peaceful protest on a riverside in Surabaya, Eastern Java. They claimed that around 20% of fish population on that river had become intersexual (male fish are growing eggs).[102] Polychlorinated Biphenyls and organochlorines pesticides were blamed for causing fish intersexuality on some

[99] 'Waste-Based Power Plants to Be Developed in Seven Cities - National - The Jakarta Post' <http://www.thejakartapost.com/news/2016/02/06/waste-based-power-plants-be-developed-seven-cities.html> accessed 13 March 2017.

[100] Peraturan Presiden Republik Indonesia Nomor 18 Tahun 2016 Tentang Percepatan Pembangunan Pembangkit Listrik Berbasis Sampah Di Provinsi Dki Jakarta, Kota Tangerang, Kota Bandung, Kota Semarang, Kota Surakarta, Kota Surabaya, Dan Kota Makassar.

[101] *Putusan Nomor 27 P/Hum/2016 Tentang Peraturan Presiden Republik Indonesia Nomor 18 Tahun 2016 Tentang Percepatan Pembangunan Pembangkit Listrik Berbasis Sampah Di Provinsi Dki Jakarta, Kota Tangerang, Kota Bandung, Kota Semarang, Kota Surakarta, Kota Surabaya Dan Kota Makassar*.

[102] Kompas Cyber Media, '5 Pria Berpakaian Ikan Duyung Protes Pencemaran Sungai Kalimas' (*KOMPAS.com*) <http://regional.kompas.com/read/2017/03/08/22404351/5.pria.berpakaian.ikan.duyung.protes.pencemaran.sungai.kalimas> accessed 9 March 2017.

rivers in Eastern Java. They also claim that PCB had contaminated breastmilk.[103] They demand that the Ministry of Environment and Forestry immediately include PCB, DDE, DDD and BPA (DDE and DDD are DDT's metabolites) on water quality standards.[104]

The demands are reasonable since the phasing out of persistent organic pollutants brought about the question of what it means to be "free" of POPs in the legal sense. Parties to the Stockholm Convention would then need to set minimum concentration of POPs in the environment, industrial products and disposal facilities. Ambient water quality is regulated under Government Regulation 82 Year 2001, however, some types of POPs, such as PCB are not yet regulated there.[105] The condition with Drinking Water Quality standard is similar as it only regulates some pesticides but not PCB.[106]

The lack of standard for POPs in water quality regulation (both surface and rinking water) is worrisome as surface water (such as rivers) are the primary source for drinking water for the waterwork companies (Perusahaan Daerah Air Minum or PDAM). Recent claim that some POPs are found in river sediments should be a cause of concern.

Some POPs such as organochlorine pesticides (OCPs) – from agricultural use, polychlorinated biphenyls (PCBs) from industrial uses, poly- and perfluorinated compounds (PFCs) and flame retardants (FRs) can pollute the air. Other POPs such as polychlorinated dibenzo-p-dioxins/furans (PCDD/Fs) and polycyclic aromatic hydrocarbons (PAHs) could result as a product of combustion.[107] The release of dioxin/furans and PAH from combustion are "unintentional production or release" under the Stockholm Convention in which states have the obligation to reduce and eventually eliminate.[108] Air quality standard in Indonesia is regulated in a 1999 Government Regulation.[109] As the regulation is antiquated (enacted in 1999), it has not address Persistent Organic Pollutants. A recent ministerial regulation issued by the Ministry of Environment and Forestry have addressed the standard for the emission of several POPs such as mercury and dioxin/furan.[110] However,the regulation is focused at emission standard for the treatment of solid waste by thermal methods.

Chemical in products are posing another problem. In 2016 an NGO sent 17 samples of rubic cube toys purchased in Jakarta and Bali and found that 3 of them contain PBDEs (Octa or Deca

[103] According to local newspapers, the findings were based on a joint research between several universities. However, we have not been able to obtain the research results. See 'Ketika Pencemaran Sungai Berdampak Pada Air Susu Ibu' (*Rappler*) <http://www.rappler.com/indonesia/berita/163632-pencemaran-sungai-berdampak-air-susu-ibu> accessed 9 March 2017.

[104] 'Kementerian Lingkungan Hidup Dan Kehutanan: Tambahkan PCB Dan Pestisida Organoklorin Dalam Baku Mutu Kualitas Air (PP no.82/2001)' (*Change.org*) <https://www.change.org/p/kementerian-lingkungan-hidup-dan-kehutanan-tambahkan-pcb-dan-pestisida-organoklorin-dalam-baku-mutu-kualitas-air-pp-no-82-2001-137e2fea-e785-4ee7-b141-260e7b2d8b88> accessed 9 March 2017.

[105] Peraturan Pemerintah Republik Indonesia Nomor 82 Tahun 2001 Tentang Pengelolaan Kualitas Air Dan Pengendalian Pencemaran Air.

[106] Peraturan Menteri Kesehatan Republik Indonesia No. 492/Menkes/PER/IV/2010 Tahun 2010 Tentang Persyaratan Kualitas Air Minum.

[107] Hayley Hung and others, 'Toward the next Generation of Air Quality Monitoring: Persistent Organic Pollutants' (2013) 80 Atmospheric Environment 591.

[108] Stockholm Convention on Persistent Organic Pollutants (POPs) 2256 UNTS 119; 40 ILM 532 (2001) (n 15). Article 5 and Annex C

[109] Peraturan Pemerintah Republik Indonesia Nomor 41 Tahun 1999 Tentang Pengendalian Pencemaran Udara.

[110] Peraturan Menteri Lingkungan Hidup Dan Kehutanan Republik Indonesia Nomor: P.70/Menlhk/Setjen/Kum.1/8/2016 Tentang Baku Mutu Emisi Usaha Dan/Atau Kegiatan Pengolahan Sampah Secara Termal.

BDes) which are prohibited by the Stockholm Convention.[111] Previous study by IPEN conducted in EU countries revaled OctaBDE and DecaBDE used in plastics for electronics are being recycled into plastic children's toys.[112]

The Law on Trade obligates products to be registered to the Ministry of Trade which are related to safety, health, environment and security.[113] Such registration does not entail that the products should fulfill certain standard. The standards are only mandatory only when obligated by sectoral legislation.

One of the possibilities to control POPs in consumer products is by creating a specific Indonesian National Standard (*Standar Nasional Indonesia or SNI*)[114] on Persistent Organic Pollutants and obligating producers to comply to such standards in a separate regulation. At present, there are no SNI for POPs. Creation of SNI on POPs would require sufficient coordination between the Ministry of Environment and Forestry and the Ministry of Trade as well as the Ministry of Industry. The Ministry of Trade could make SNI on POPs mandatory for imprted products whereas the Ministry of Industry could make SNI on POPs mandatory for domestic products.

6. Conclusions

This article demonstrate that phasing-out Persistent Organic Pollutants – depending on the type of POPs – may require some adjustment to Indonesian Regulatory Framework.

Phasing out of persistent organic pollutants entails several consequences:

First, there needs to be a transitional arrangement for chemicals which are still in use. What this entails is that the utilization of such chemicals must be regulated. Secondly, phasing out may require development of infrastructure and facilities which, at the time is nonexistent or noncompliant with the requirement of Stockholm Convention. Third, regulatory framework must be relaxed in order to allow for the stockpile to be stored until national disposal facility can be built. At the same time, regulatory framework must bear the risk of contamination which occurs due to the relaxation of the storage period.

Fourth, regulatory framework must incorporate a mix of incentive mechanism, both positive – such as relaxed storage period during phasing out and delayed enforcement-- and negative incentive such as the obligation to register the ownership of POPs. Fifth, legislation needs to accommodate various types of chemicals, such as "mixture" and "articles". Existing legislation are too focused on "substance" and as a result, may not cover chemicals inside equipments.

Sixth, as the list of POPs under the Stockhom Convention is growing, legislation needs an efficient way to modify or amend existing legisation specifying the list of POPs. Existing legislation require amendment of a Government Regulation – this is too cumbersome and would take plenty of time.

[111] 'Siaran Pers: Bahan Kimia Berbahaya Dari Sampah Elektronik (E Waste) Ditemukan Pada Mainan Asah Otak Yang Beredar Di Pasaran Indonesia' (n 85).
[112] Joseph DiGangi, Jitka Strakova and Arnika Association, 'ToXIC Toy or Toxic Waste: Recycling POPS into New Product S Joseph DiGangi, Ph.D. Jitka Strakova October 2015 Summary for Decision-Makers' (IPEN 2015).
[113] Undang-Undang Republik Indonesia Nomor 7 Tahun 2014 Tentang Perdagangan. Article 32
[114] Undang-Undang Republik Indonesia Nomor 20 Tahun 2014 Tentang Standardisasi Dan Penilaian Kesesuaian.

It sufficient that future legislation authorize the Minister of Environment to prescribe the list of POPs.

Although for some POPs production has been banned, the prohibition on import is not effective. This require sectoral regulation (in trade and custom) which directly refers to the list of POPs prescribed by the Ministry of Environment.

Finally, since the management of POPs involves various government authorities such as Ministry of Environment, Ministry of Finance, Ministry of Trade, Ministry of Industry and Ministry of Agriculture, they must harmonise their policy in order to implement the mandate of the Stockholm Convention.