

**Mercury-free
alternatives in
the Philippines:**
batteries, lamps, and
medical measuring devices



Acknowledgments

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Abbreviations and Acronyms

ASGM	Artisanal and Small-Scale Gold Mining
BOC	Bureau of Customs, Department of Finance
BPS	Bureau of Philippine Standards, Department of Trade and Industry
CCFL	Cold Cathode Fluorescent Lamp
CCO	Chemical Control Order
CFL	Compact Fluorescent Lamps
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DOE	Department of Energy
DOH	Department of Health
DOST	Department of Science and Technology
DTI	Department of Trade and Industry
EEB	European Environmental Bureau
EEFL	External Electrode Fluorescent Lamp
EMB	Environmental Management Bureau
FDA	Food and Drug Administration, Department of Health
HPMV	High Pressure Mercury Vapor
HPS	High Pressure Sodium
KII	Key Informant Interview
LED	Light-emitting Diode
LFL	Linear Fluorescent Lamp
MAPs	Mercury Added Products
MCMMDs	Mercury-Containing Medical Measuring Devices
MSHS	Manila Science High School
PNS	Philippine National Standards
PSA	Philippine Statistics Authority
PSG	Project Steering Group
WHO	World Health Organization
ZMWG	Zero Mercury Working Group



Introduction

Mercury-free alternatives in the Philippines: batteries, lamps, and medical measuring devices is a study that aims to assess the availability of alternatives to Mercury-Added Products (MAPs) in the country, in compliance with the provisions set in the Minamata Convention on Mercury.

The project is executed by BAN Toxics with funding and support from the European Environmental Bureau.

Organizational Background

BAN Toxics is an independent non-government environmental organization that works for the advancement of environmental justice, health, and sustainable development in the area of chemicals and wastes with a special focus on women, children, and other marginalized sectors.

The organization works closely with government agencies, communities, and civil society at the local, national, and international levels to reduce and eliminate the use of toxic chemicals and support global sustainable development goals through education campaigns, community grassroots interventions, training and capacity-building, policy research and development, and advocacy programs.

In its work on mercury, BAN Toxics has been a consistent presence in advocating for the ratification of the Minamata Convention in the Philippines.

The **Zero Mercury Working Group** (ZMWG) was started by the European Environmental Bureau (EEB) in collaboration with the Mercury Policy Project. ZMWG is an international coalition of more than 110 public interest environmental and health non-governmental organizations from over 50 countries, including BAN Toxics.

The coalition strives for zero supply and demand, and emissions of mercury from all sources in view of reducing to a minimum the mercury levels in the environment at the European and global levels.

Project Steering Group for Mercury-Added Products

As part of the project, BAN Toxics has convened a project steering group (PSG) consisting of members from relevant government agencies as well as representatives from the academe. The PSG serves to 1) provide support and technical guidance in the conduct of BAN Toxics' various MAPs-related activities and 2) provide a venue for members to coordinate with and deliver updates to each other as well as to foster multi-stakeholder partnerships in relation to the management of MAPs.

The members of the PSG include:

Table 1: Members of the Project Steering Group

Name	Section	Agency/Organization
Permanent: Geronimo Sañez (Chief) Alternate: Leonie Ruiz, Engineer III Patrick Cristobal, Sr. EMS Santini Quiocson, Engineer II	Hazardous Waste Management Section	Environmental Management Bureau, Department of Environment and Natural Resources (DENR)
Permanent: Edwin Navaluna, Chief Alternate: Angelica Gallego, Sr. EMS Alyanna Uy, Engineer II	Chemicals Management Section	Environmental Management Bureau, DENR
Engr. Helen Ocampo, Chief	Product Research and Standards Development Division	Food and Drug Administration, Department of Health (DOH)
Jonathan Belmonte	Environmental Protection and Compliance Division	Bureau of Customs (BoC)
Raymond Sucgang, Head	Nuclear Analytical Techniques Application Section	Philippine Nuclear Institute, Department of Science and Technology (DOST)
Permanent: Engr. Mario Gaudiano, Chief Alternate: Engr. Avelino Molina	Standards Development Division	Bureau of Philippine Standards, Department of Trade and Industry (DTI)
Dr. Lawrence Belo	Associate Professor	De La Salle University

What is Mercury?

Mercury and mercury compounds are highly toxic substances that pose significant risks to human and environmental health. According to the World Health Organization (WHO),¹ mercury is considered one of the top ten chemicals of major public health concern. Mercury exposure can severely impact the nervous, digestive, and immune systems, as well as the kidneys and the lungs, among others. At times, mercury-related illnesses can be fatal.

Mercury in its most toxic forms is capable of bio-accumulating in living organisms, and bio-magnifying through the food chain. As predators eat other organisms containing mercury over time, mercury can accumulate within them in levels that are greater than in their habitats or their food. As it bio-magnifies through the food chain, mercury can also potentially be transported across

wide distances.² These transport and transformation mechanisms allow mercury to pollute long distances and contaminate global food supplies at levels which pose significant risks.

Mercury is used in a variety of products and processes. The 2018 Global Mercury Assessment³ identifies Artisanal and Small-Scale Gold Mining (ASGM) as the primary source of anthropogenic mercury emissions and releases. ASGM communities use mercury to extract gold ores through amalgamation. The report also identifies waste from products as a top five contributor to emissions and releases. These mercury-added products (MAPs) include common household appliances and products such as lighting equipment, batteries, switches, cosmetics, and a variety of measuring devices, among others.

Background and Objectives of the Study

The study titled **Mercury-free alternatives in the Philippines: batteries, lamps, and medical measuring devices** is conducted as part of the project titled *“Contribution towards early ratification and implementation of the Minamata Convention on Mercury and towards phasing out of mercury-added products (MAPs) in the Philippines.”* The study aims to provide a better understanding of the availability of mercury-free alternatives and products that comply with the Minamata Convention guidelines.

Specifically, the objectives of the study include:

1. Assess the availability of mercury-free alternatives for batteries, lighting equipment, and medical measuring devices,
2. Identify key industry trends for the use, import, export, and manufacture of MAPs, and
3. Formulate recommendations to improve current monitoring and regulation mechanisms for MAPs.

The study supports the Philippine government’s efforts to phase-out MAPs by 2022 in compliance with local policies and with guidelines outlined in the Minamata Convention on Mercury. The study focuses on assessing the availability of mercury-free alternatives, with a specific focus on batteries, lamps, and medical measuring devices.

Methodology

The following data-collection tools were employed during the study:

Desk Research

Desk research was conducted for the study focusing on a) policies relevant to the management of mercury-containing batteries, lamps, and medical measuring devices as well as their alternatives, b) data regarding import, export, and manufacture (if available) of Mercury-Added Products, and c) related articles, studies, and data on the management of MAPs in the Philippines.

In addition, the study also reviews relevant national documents such as the Minamata Initial Assessment and accompanying documents such as Philippine Mercury Inventory Report to validate data regarding the use and trade of mercury-containing products which in turn provides valuable insights on consumer and industry perspectives with regards to shifting to mercury-free alternatives.

Key Informant Interviews and Related Discussions

Key Informant Interviews (KII) were conducted for the study focusing on government agencies relevant to the management of MAPs in the Philippines. These interviews focused on all or some objectives including:

- identifying key industry and policy trends in the management of MAPs in the country,
- validating research findings and acquiring relevant government data, and
- identifying key personnel or agencies for further interviews.

As part of the study, BAN Toxics coordinated with the following agencies:

- Food and Drug Administration, Department of Health
- Lighting and Appliance Testing Division, Department of Energy
- Environmental Management Bureau, Department of Environment and Natural Resources
- Trade Statistics Division, Philippine Statistics Authority

Focus Group Discussions and Stakeholder Workshops

BAN Toxics participated in various discussions and workshops related to the study focus. The organization participated in the Bureau of Philippine Standards' (BPS-DTI) public consultation for "The new technical regulation concerning the mandatory certification of mercury-added products," where key points of discussion were introduced by the organization.

BAN Toxics also convened a project steering group in relation to MAPs-related work and conducted the first meeting on December 9, 2021. As part of the activities, the methodology and the preliminary results were presented to the PSG members for further comments and to validate if the results are accurate and reflective of current market trends.

Scope and Limitations

The study covers national trade data for MAPs from 2017 to 2020. Due to time limitations and challenges related to the COVID-19 pandemic, the study excludes MAPs such as cosmetics, switches, and pesticides from its scope and instead focuses on mercury-containing batteries, lamps, and medical measuring devices. During KII and the desk research, relevant data, projects, and programs from 2010 to 2020 were reviewed.

Initially, the research design included the conduct of key informant interviews and surveys with major traders and manufacturers of MAPs. These activities were designed to validate the trade information available from government sources. However, the contacted companies were unable to participate in the study, and the research design was modified to reflect this. Instead, the data and information collected from government sources were validated through comparisons with external literature and through cross-validation with other government agencies who participated in the study.

Timeline of Activities

The table below outlines the timeline of activities for the project conducted over a 14-week period starting in the 2nd half of September 2021.

Table 2: Timeline of Activities

ACTIVITY	September				October				November				December			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Development of work plan and methodology																
Desk Research																
Development of data-gathering tools																
Coordination with stakeholders (government agencies)																
Coordination with stakeholders (private industry representatives)																
Conduct of Key Informant Interviews <ul style="list-style-type: none"> FDA-DOH DOE EMB-DENR PSA 																
Key Activity: <ul style="list-style-type: none"> Participation in public consultation for BPS-DTI policy on MAPs 																
Coordination with stakeholders (PSG)																
Development of 1 st draft document																
Key Activity: <ul style="list-style-type: none"> PSG 1st Convenor's Meeting 																
Development of final document																

Situational Assessment

This section discusses the relevant policies at the global and the local levels that govern mercury-added products in the Philippines. To summarize, the Philippine government has committed to phase-out mercury-added products (MAPs) including batteries, lamps, and mercury-containing medical measuring devices (MCMMDs). The phase-out will be implemented in 2022 instead of the 2020 date outlined in the Minamata Convention on Mercury, to provide ample time for distributors to adjust their operations in accordance with the phase-out and related policies.

The Minamata Convention on Mercury

The Minamata Convention on Mercury is a global multilateral environmental agreement which aims to protect human health and the environment from the adverse effects of mercury pollution.⁴ The Convention is named after the Minamata Bay in Japan where mercury-tainted industrial wastewater led to the poisoning of thousands of people starting in the 1950s. The severe health damage later became known as the Minamata disease.⁵

The Convention was adopted in 2013 and entered into force in August of 2017. Currently, there are 135 Parties⁶ to the Convention who are working together to control mercury supply and trade, reduce the use, emission, and release of mercury, raise public awareness, and build the necessary institutional capacity. In 2020, the Philippines ratified the Minamata Convention.⁷

Among a number of objectives, the Convention aims to:

- Contribute towards the reduction and, if possible, the elimination of mercury use in the Artisanal and Small-Scale Gold Mining sector
- Regulate mercury emissions from industries such as coal-fired power plants and industrial boilers, metals and cement production, and waste incineration (among others)
- Contribute to the reduction and, if possible, the elimination of mercury use in manufacturing processes such as chlor-alkali production, vinyl chloride monomer production, and acetaldehyde production
- Contribute to the phase-out or reduction of mercury use in products such as batteries, switches, lights, cosmetics, pesticides, and measuring devices as well as the reduction of mercury used in dental amalgam.

The Minamata Convention on Mercury-Added Products (MAPs)

Article 4 of the Convention⁸ specifies that Parties shall appropriate measures to prohibit the manufacture, import, and export of specific mercury-added products listed in Part I of Annex A. The article also outlines specific phase-out dates for the products and requires Parties to submit a review of the progress and effectiveness of the measures taken to reduce MAPs.

Annex A of the Convention text outlines MAPs subjected to the phase-out while excluding products that:

- are essential for civil protection and military uses,
- are products for research, calibration of instrumentation, for use as reference standard,
- have no feasible mercury-free alternative for replacement that is available, switches and relays, cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for external displays and measuring devices,
- produces used in traditional or religious practices, and
- vaccines containing thiomersal as preservatives.

Annex A also outlines products that are subject to the phase-out specified in Article 4 of the Convention text as outlined in the table below:

Table 3: Annex A - Minamata Convention on Mercury

Mercury-Added Products	Phase-out Date
Batteries, except for button zinc silver oxide batteries with a mercury content < 2% and button zinc air batteries with a mercury content < 2%	2020
Switches and relays, except very high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and relays in monitoring and control instruments with a maximum mercury content of 20 mg per bridge, switch or relay	2020
Compact fluorescent lamps (CFLs) for general lighting purposes that are ≤ 30 watts with a mercury content exceeding 5 mg per lamp burner	2020
Linear fluorescent lamps (LFLs) for general lighting purposes: (a) Triband phosphor < 60 watts with a mercury content exceeding 5 mg per lamp; (b) Halophosphate phosphor ≤ 40 watts with a mercury content exceeding 10 mg per lamp	2020
High pressure mercury vapour lamps (HPMV) for general lighting purposes	2020
Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length (≤ 500 mm) with mercury content exceeding 3.5 mg per lamp (b) medium length (> 500 mm and ≤ 1 500 mm) with mercury content exceeding 5 mg per lamp (c) long length (> 1 500 mm) with mercury content exceeding 13 mg per lamp	2020
Cosmetics (with mercury content above 1ppm), including skin lightening soaps and creams, and not including eye area cosmetics where mercury is used as a preservative and no effective and safe substitute preservatives are available	2020
Pesticides, biocides and topical antiseptics	2020
The following non-electronic measuring devices except non-electronic measuring devices installed in large-scale equipment or those used for high precision measurement, where no suitable mercury-free alternative is available: (a) barometers; (b) hygrometers; (c) manometers; (d) thermometers; (e) sphygmomanometers.	2020

Relevant National Policies on Mercury-Added Products in the Philippines

The study focuses on assessing the availability of mercury-free alternatives to batteries, lamps, and medical measuring devices. These MAPs are regulated primarily by Department Administrative Order 2019-0020 otherwise known as the “Revised Chemical Control Order (CCO) for Mercury and Mercury Compounds”⁹ which updates DAO 1997-38, otherwise known as the CCO for Mercury and Mercury Compounds.

The revised CCO is consistent with the provisions outlined in the Minamata Convention on Mercury and sets a phase-out date of 2022 for the products listed in Annex A of the Convention text, instead of the 2020 originally targeted in the Minamata Convention text. The 2022 phase-out was identified due to a number of reasons, including the late ratification of the Convention in the Philippines and to give ample time for distributors to adjust before the phase-out is officially implemented.

The CCO also outlines various requirements and protocols for importers and manufacturers of MAPs before the phase-out is implemented. A summary of these requirements include:

- Any person or entity importing, manufacturing, distributing, storing, or allowed user of mercury, mercury compounds, and mercury-added products must register with the Department of Environment and Natural Resources (DENR) through the Environmental Management Bureau (EMB)
- Any person importing MAPs are required to secure a clearance from appropriate government agencies such as the Department of Trade and Industry's Bureau of Philippine Standards (BPS-DTI) for lamps and batteries and the Department of Health (DOH) for cosmetic products
- Importers, manufacturers, distributors, and industrial users of mercury, mercury compounds, and MAPs including treaters and disposers of mercury-bearing and/or mercury-contaminated wastes are required to submit quarterly reports to the EMB with information including a) the quantity of products supplied, b) the names and addresses of the importer, manufacturer, distributor and purchasers, and c) the quantity of mercury-bearing and/or mercury-contaminated wastes generated, among others.

Relevant Policies Impacting the Availability of MAPs and Alternatives

There are also a few policies that have impacted the availability of MAPs and alternatives and contributed towards shaping trader and consumer behavior. DAO 2008-0021, otherwise known as the "Gradual phase-out of mercury in all Philippine health care facilities and institutions" and the currently in-development DAO titled "The new technical regulation concerning the mandatory certification of mercury-added products."

Department Order 2008-0021¹⁰ outlines guidelines for the elimination of mercury-containing devices in healthcare facilities in the Philippines. Key provisions of the DAO include requirements for registered healthcare facilities to implement within 2 years the following:

- The switch to mercury-free alternatives with specific focus on thermometers and, if possible, sphygmomanometers.
- The implementation of a mercury-minimization program
- The development and implementation of a mercury management module in accordance with the guidelines set in the DAO

The enactment of the DAO significantly impacted the trade of mercury-containing thermometers and sphygmomanometers, as its primary users were prohibited from using them. In a study conducted by BAN Toxics in 2021, the users of MCMMDs in the Philippines were reduced from 5% of total Healthcare Facilities (HCFs) in 2010 to just 1% in 2020 for thermometers and from 4% to just 0.7% during the same period for sphygmomanometers.¹¹

There have also been recent developments aiming to impose a total ban on MCMMDs outside of the healthcare setting. In 2021, the Food and Drug Administration (FDA)¹² started developing the draft policy titled "Banning of all mercury-containing thermometers, sphygmomanometers, liquid mercury, and dental amalgam capsules" to impose a total ban of these devices in accordance with various policies such as the aforementioned DAO 2008-0021 and the revised CCO on mercury and mercury compounds.

Similarly in accordance with the phase-out objectives identified by the revised CCO, the Department of Trade and Industry (DTI) through the Bureau of Philippine Standards (BPS) started developing the DAO titled "The new technical regulation concerning the mandatory certification of mercury-added products."¹³ The new DAO aims to impose a certification scheme which requires manufactures and traders to meet mercury limits in their products before they are allowed to operate.

The proposed limits for mercury content in the following products are consistent with the limits set by the revised CCO on mercury and mercury compounds, which in turn are consistent with the limits identified by the Minamata Convention on Mercury. The table below outlines the contents of the draft DAO:

Table 4: Highlights - Draft DAO on Mercury-Added Products

Product	Allowable Mercury Content
Button zinc silver oxide batteries	Mercury content less than 2% of the unit mass
Button zinc air batteries	
Tilt Switch	Mercury content less than 20 mg per bridge
Inclination Switch	
Flame sensor Switch	
Float Switch	
Mercury Seismic Switch	
Pressure Switch	
Temperature Switch	
Mercury Displacement Relays	
Mercury Reed Relays	
Mercury Overcurrent Relay	
Mercury Wetted Reed Relay	
Mercury Contact Relay	
High Frequency Switches (3MHz to 30 MHz)	
High Frequency Relays (3MHz to 30 MHz)	
Compact fluorescent lamps (CFLs) for general lighting purposes ≤ 30 watts	
Linear fluorescent lamps (LFLs) for general lighting purposes: Triband phosphor < 60 watts	
Linear fluorescent lamps (LFLs) for general lighting purposes: Halophosphate phosphor ≤ 40 watts	Mercury content less than 10 mg per lamp
Cold Cathode Fluorescent Lamps (CCFL) and External Electrode Fluorescent Lamps (EEFL): short length (≤ 500 mm)	Mercury content less than 3.5 mg per lamp
Cold Cathode Fluorescent Lamps (CCFL) and External Electrode Fluorescent Lamps (EEFL): medium length (> 500 mm and ≤ 1 500 mm)	Mercury content less than 5 mg per lamp
Cold Cathode Fluorescent Lamps (CCFL) and External Electrode Fluorescent Lamps (EEFL): long length (> 1 500 mm)	Mercury content less than 13 mg per lamp

Availability of Alternatives for Mercury-Added Products

In phasing out mercury-added products, it is important to identify safer alternatives that can replace them. The table below lists the alternatives for batteries, lighting, and measuring devices recommended by the UN Environment Programme (UNEP), the US Center for Disease Control and Prevention (CDC), as well as alternatives identified in available documents and submissions sourced from the Minamata Convention on Mercury website.

Table 5: List of Recommended Alternatives

Product Category	Prohibited Products	Identified Alternatives		
		UNEP ^{14, 15}	US CDC ¹⁶	Minamata Convention Submissions
Batteries	Button cell batteries with specific mercury content	Mercury-free batteries such as lithium, silver, and alkaline batteries	Mercury-free versions of zinc-air or silver oxide batteries	Mercury-free silver oxide and zinc-air batteries, lithium batteries ¹⁷
Lighting	Compact fluorescent lamps (CFLs) with specific mercury content	Light Emitting Diode (LED), LED downlight	None listed	LED ¹⁸
	Linear fluorescent lamps (LFLs) with specific mercury content	Linear LED	None listed	LED
	High pressure mercury vapour lamps (HPMV) for general lighting purposes	Halogen, LED, mercury-free units	None listed	LED, mercury-free high pressure sodium lamps (HPS), unsaturated vapour HPS and Xenon HPS lamps ¹⁹
	Cold cathode fluorescent lamps and external electrode fluorescent lamps with specific mercury content (electronic displays)	LED	None listed	LED
Measuring Devices	Mercury-containing thermometers	For fever thermometers: digital or liquid-in-glass thermometers For non-fever thermometers: bi-metal, digital, infrared, liquid-in-glass	Alcohol and mineral spirits-based glass bulb thermometers, dot matrix thermometers, or digital thermometers	Thermometers and digital thermometers that use other non-mercury liquids ²⁰
	Mercury-containing sphygmomanometers	Aneroid, oscillometers	Digital or aneroid devices	Aneroid, oscillometers

The following sections discuss the availability of these mercury-free alternatives based on data acquired from the Philippine Statistics Authority (PSA) in comparison with the trade data for their mercury-containing counterparts. Product listings available from major retailers of batteries, medical measuring devices, and lamps were reviewed to assess whether there are enough alternatives to replace mercury-free products.

The availability of mercury-containing devices from major online sources such as *Lazada* and *Shopee* were also explored.²¹ *Shopee* is the leading e-commerce platform in the Philippines, with an average of more than 54.6 million web visits per month. *Lazada* is a close second, accounting for an average of more than 38 million monthly web visits. Online trading platforms

such as these often are venues for unregulated importation as products are only sent to buyers after purchase directly from distributors who are based both in and outside of the country.

Furthermore, peer-to-peer trading platforms such as Facebook Marketplace and eBay have also been known to be venues where mercury-containing devices are sold, as these are considered unregulated personal transactions.

Medical Measuring Devices

Mercury is used in a variety of measuring devices. It is the only known metal that retains its liquid state at room temperature, and it expands and contracts evenly depending on changes in the temperature and pressure.²²

Most common of the measuring devices that contain mercury include thermometers and sphygmomanometers. Thermometers measure temperature and contain mercury encased in a thin plastic or glass tube and are used in a variety of industry, laboratory, and medical settings. Sphygmomanometers on the other hand are a kind of manometer that measures blood pressure by measuring both the maximum and minimum arterial pressure.

As discussed in Chapter II, the use of mercury-containing thermometers and sphygmomanometers have been effectively banned in healthcare facilities in the Philippines. This has significantly reduced the demand for these

devices from their primary customers. Still, these MCMMDs continue to be in limited use in healthcare facilities and in other settings. In 2013, a mercury spill at the Dr. Jose Fabella Memorial Hospital in Manila prompted a cleanup that required the transfer of at least 40 patients from the pediatric ward.²³ A few years later in 2017,²⁴ a mercury spill occurred in Manila Science High School (MSHS) when mercury-containing thermometers were accidentally broken in the school laboratories.

Trade Statistics for MCMMDs and Alternatives

By ratifying the Minamata Convention on Mercury and enacting the Revised CCO on Mercury and Mercury Compounds, the Philippine government commits to phasing out these MCMMDs. The table below outlines recorded trade data for thermometers. However, recorded importation data for sphygmomanometers is unavailable from the PSA.

Both mercury-containing thermometers and sphygmomanometers are no longer imported into the country significantly, as stated by the Philippine Mercury Inventory Report (Chapter V). In a key informant interview with the Food and Drug Administration, the agency is not aware of any local manufacturers for MCMMDs. This information is validated by the trade data from the PSA, as outlined in the table below.

Table 6: Importation Data - Measuring Devices

Product Category: Measuring Devices (Import)								
Commodity Description	2017		2018		2019		2020	
	Quantity	Value (USD)	Q	V	Q	V	Q	V
Mercury-Containing Thermometers	0	0	0	0	0	0	0	0
Thermometers ^a	376,609	4,203,100	952,855	5,028,910	309,640	5,583,757	74,462	4,711,621

Main sources of imports for thermometers include China, Hong Kong, Germany, Italy, Japan, Singapore, the United States of America, and Korea, among others.

The import data for mercury-free alternatives show an increasing trend for the importation of mercury-free alternatives. This is consistent with a study conducted by BAN Toxics²⁵ which shows that healthcare facilities (the primary users of medical measuring devices) have shifted to mercury-free alternatives starting with the implementation of the MCMMD ban in healthcare facilities. This is also seen as a significant factor that has driven the import of MCMMDs lower.

^a Categorized as electrically operated thermometers and pyrometers

The results of the study highlight that only 1% (thermometers) and 0.7% (sphygmomanometers) of healthcare facilities still used MCMMDs in the Philippines. Moreover, the purchase trends for mercury-free alternatives have increased exponentially since 2010, consistent with the trade data cited by the PSA. The table below summarizes the purchase data presented in that study:

Table 7: Thermometers and Sphygmomanometers Purchase Data

Mercury-Containing Medical Measuring Devices and Alternatives – Purchase Data per Unit (Healthcare Facilities)						
Year	Mercury-Containing Devices ^b			Mercury-Free Devices ^c		
	THERMOMETERS (TH)	STANDING SPHYGS. (SSP)	DESK SPHYGS. (DSP)	TH	SSP	DSP
2010	2647	66	165	53,103	450	925
2011	1577	57	151	52,340	336	749
2012	535	67	152	59,693	344	765
2013	313	45	186	72,002	426	883
2014	286	56	27	75,841	476	977
2015	80	23	34	97,638	505	1,134
2016	45	69	29	101,438	759	1,306
2017	25	35	22	131,773	644	1,505
2018	26	33	28	149,834	691	2,022
2019	26	23	22	148,450	763	1,931
2020	50	43	26	111,734	958	2,894

In terms of exports, trade data shows that the Philippines does not export mercury-containing thermometers. For alternatives, the country exports mainly to countries such as Finland, Russia, the USA, Austria, and Canada, among others.

Table 8: Exportation Data - Measuring Devices

Product Category: Measuring Devices (Export)								
Commodity Description	2017		2018		2019		2020	
	Quantity	Value (USD)	Q	V	Q	V	Q	V
Mercury-Containing Thermometers	0	0	0	0	0	0	0	0
Thermometers ^d	78,651	759,157	11,387	395,196	111,109	531,067	61,404	408,004

In conclusion, the trade statistics have shown that alternatives are readily available, while legally imported mercury-containing devices are scarce.

^b Out of the 507 respondents, only 40 (thermometers), 18 (desk sphygmomanometers), and 20 (standing sphygmomanometers) have purchase data for MCMMDs.

^c Out of 507 respondents, 266 facilities provided data from 2010 to 2020.

^d Categorized as electrically operated thermometers and pyrometers

Availability through Major Online Platforms

Despite the continued decrease in legally imported MCMMDs in the Philippines, it may still be possible to purchase them through unregulated sources.

A quick online search shows that both mercury-containing thermometers and sphygmomanometers are readily available on *Lazada* through local or foreign traders.

As these are most often imported individually and only when purchased, these products may not necessarily be reflected in formal trade statistics.

Still, the majority of products available online through major trading platforms in the Philippines are already mercury-free. This is especially true for products available domestically, which are comprised mostly of digital infrared thermometers and thermometers based on other liquids, as well as aneroid and digital sphygmomanometers. The image below shows the top domestic results for the term “thermometers” and “sphygmomanometers” on *Shopee*, and also highlights the affordability of alternatives when compared to mercury-containing devices.

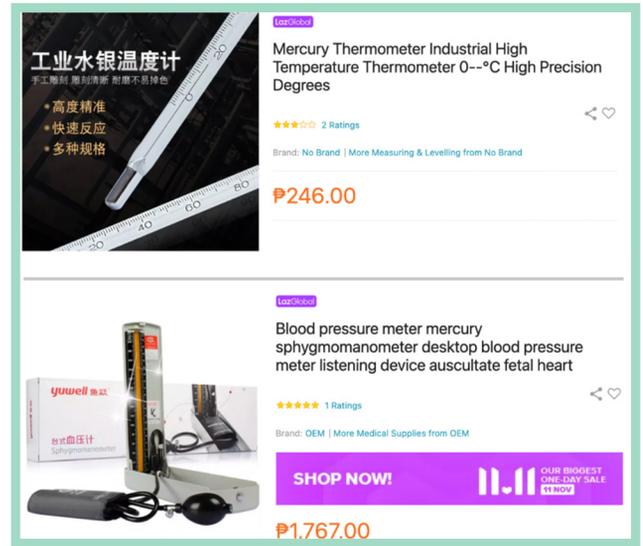


Figure 1: Availability of MCMMDs - Lazada

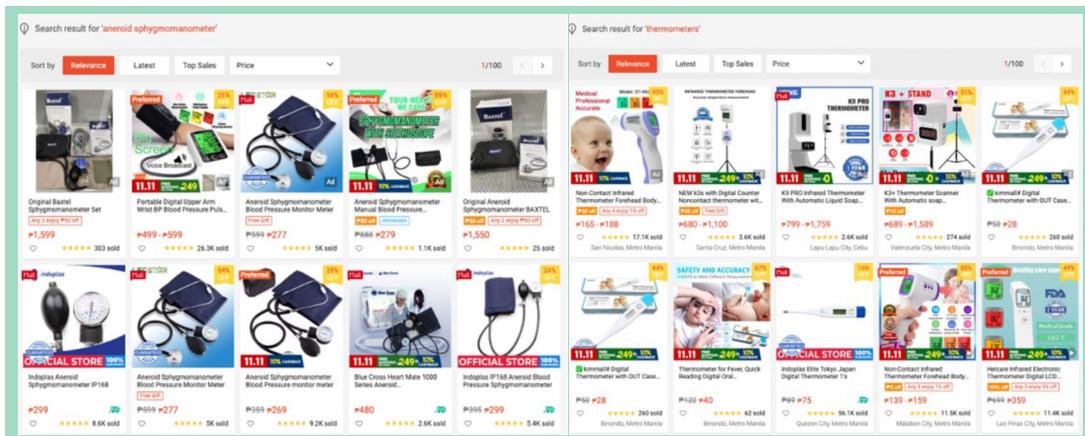


Figure 2: Sphygmomanometers and thermometers available on Shopee

Batteries

Mercury is used in the manufacture of batteries to prevent the buildup of internal gases that can cause batteries to bulge and leak.²⁶ Today, most batteries that still use mercury are button cell batteries and mercuric oxide batteries.

Button cell batteries refer to miniature batteries that are shaped like coins or buttons and provide power for small portable devices.²⁷ Of the four major technologies used to manufacture button cell batteries, only lithium-based batteries do not contain intentionally added mercury. Small amounts of mercury are at times still used in the other three technologies – zinc air, silver oxide, and alkaline. Zinc air batteries are used mostly for hearing aids, silver oxide batteries are used in watches and cameras, and alkaline manganese batteries are used in calculators, toys, and digital thermometers, among others. Still, there are mercury-free versions of these three batteries available in the market.^{28 29 30}

Another kind of battery that still use mercury are mercuric oxide batteries. These are mainly used for military and medical equipment that require stable currents and long life.³¹ These mercuric oxide batteries are often in larger forms for use in devices such as walkie-talkies.³²

The revised CCO on Mercury and Mercury compounds likewise mandates a 2022 phase-out for button cell and mercuric oxide batteries that are not compliant with the Minamata Convention on Mercury guidelines.

Trade Statistics for Mercury-Containing Batteries and Alternatives

In a review of marketing material provided by major battery providers in the Philippine such as Eveready³³ and Energizer,³⁴ it is apparent that mercury-free batteries are priority products. This is consistent with trade statistics available from the PSA, which shows low import statistics for mercuric oxide batteries, which was reduced from 217,618 units to just 3 units in 2020. However, total units imported for silver oxide, lithium, zinc air, and alkaline (categorized as manganese dioxide) remained significant over the same period.

Table 9: Importation Data - Batteries

Product Category: Batteries (Import)								
Commodity Description	2017		2018		2019		2020	
	Quantity	Value (USD)	Q	V	Q	V	Q	V
Mercuric Oxide	217,618	479,584	1,334	267,411	0	0	3.00	1,495
Silver Oxide	1,630	3,638	934	49,037	4,323	109,681.00	5,682	112,256
Lithium	2,563,240	10,474,806	45,369	49,347,655	8,125,733	54,885,723	418,297	34,269,210
Zinc Air ^e	28,244,132	357,579	11,805	2,914,234	2,518,623	1,379,540	21,698	822,927
Manganese Dioxide ^f (not exceeding 300 cm ³)	13,296,100	8,813,537	4,854,860	8,576,919	6,441,175	7,666,559	16,292,463	17,499,947
Manganese Dioxide (Other)	1,938,002	2,435,674	4,148,732	5,595,594	3,138,604	2,703,709	746,236	1,674,064

Mercuric oxide batteries were sourced from Thailand (2017 to 2018) and Japan (2020), respectively. Alternatives were sourced from countries such as China, Taiwan, Indonesia, South Korea, Malaysia, Singapore, the United States, Sweden, Germany, Hong Kong, Norway, France, Australia and Vietnam from 2017 to 2020.

In terms of exports, the Philippines records low numbers across battery types, as listed in the table below. Furthermore, the Philippines has no recorded data on the exportation of mercuric oxide batteries, among others.

Table 10: Exportation Data - Batteries

Product Category: Batteries (Export)								
Commodity Description	2017		2018		2019		2020	
	Quantity	Value (USD)	Q	V	Q	V	Q	V
Mercuric Oxide	0	0	0	0	0	0	0	0
Lithium	26,733.77	1,028,568.00	170	646,766	22,072	2,591,627	28,171	2,579,713
Zinc Air ^g	0	0	483	23,528	703	186,306	1,666	48,765
Manganese Dioxide (Other)	375,441.00	131,547.00	867,175	299,222	1,590	4,854	232	550

Main export destinations include China, Israel, Turkey, the Czech Republic, Hong Kong, India, Japan, South Korea, Singapore, Switzerland, the United Arab Emirates, the US, and Vietnam, among others.

^e Categorized as "other" or having an external volume exceeding 300 cubic centimeters
^f This to alkaline batteries which derive its energy from manganese dioxide, among others.
^g Categorized as "other" or having an external volume exceeding 300 cubic centimeters

Availability of Mercury-Containing Batteries and Alternatives from Major Distributors

Four of the major distributors of batteries in the Philippines are identified as Panasonic, Eveready, Energizer, and Maxell. Of the four, only Panasonic is listed as currently manufacturing products through its factories in Sta. Rosa and the Taytay Plant where its first dry battery plant in the country was established. It is unclear, however, if these plants still produce batteries.³⁵

Eveready and Energizer batteries were produced in the Philippines until 2011 in their Mandaue City manufacturing plant. When the carbon zinc battery plant closed down, all battery requirements for the Philippines from both brands were subsequently imported from China, Singapore, and Indonesia.³⁶

The table below lists the kinds of button cell batteries available from major battery providers in the Philippines:

Table 11: Available Products - Major Battery Distributors

Products Available – Main Distributors (Batteries)			
Panasonic ³⁷	Eveready ³⁸	Energizer ³⁹	Maxell ⁴⁰
Lithium Coin Battery CR-2016PT (1B/5B)	No button cell batteries available	Lithium Coin Battery CR2016	Lithium Coin Battery CR 2016
Lithium Coin Battery CR-2025PT (1B/5B)		Lithium Coin Battery CR2025	Lithium Coin Battery CR 2025
Lithium Coin Battery CR-2032PT (1B/5B)		Lithium Coin Battery CR2032	Lithium Coin Battery CR 2032
			Alkaline Button Cell LR44 (Mercury-Free) ⁴¹
			Silver Oxide Button Cell SR726SW (Mercury Free) ⁴²
			Zinc Air Button Cell PR44 (Mercury-Free) ⁴³
			Zinc Air Button Cell PR48 (Mercury-Free)
			Zinc Air Button Cell PR536 (Mercury-Free)

Reviewing both the products listed by the websites of major sources as well as the trade statistics provided by the PSA, it is apparent that battery supply has shifted significantly to mercury-free alternatives over the past few years. Of the four major battery providers in the Philippines, only Maxell provides all four variations – lithium, alkaline, silver oxide, and zinc air batteries. However, all battery types are listed as mercury-free.

Availability Through Other Sources

The majority of button cell batteries available online through *Lazada* and *Shopee* are produced by the four major brands identified earlier (Panasonic, Eveready, Energizer, Maxell). However, only Maxell lists non-lithium batteries such as zinc air as available. Zinc air batteries are used mainly for hearing aids and comprise the bulk of button cell batteries available through e-commerce sites.

The top results for *Lazada* show foreign brands such as *RAYOVAC*, *Powerone*, *Engione*, and *Zenipower* who are selling zinc air batteries. Silver oxide and alkaline button cell batteries from manufacturers such as *Sony* and *Duracell* are also available on the site. Still, these products are listed as mercury-free.

Mercury-containing button cell batteries were also unavailable through Facebook marketplace and eBay when checked.

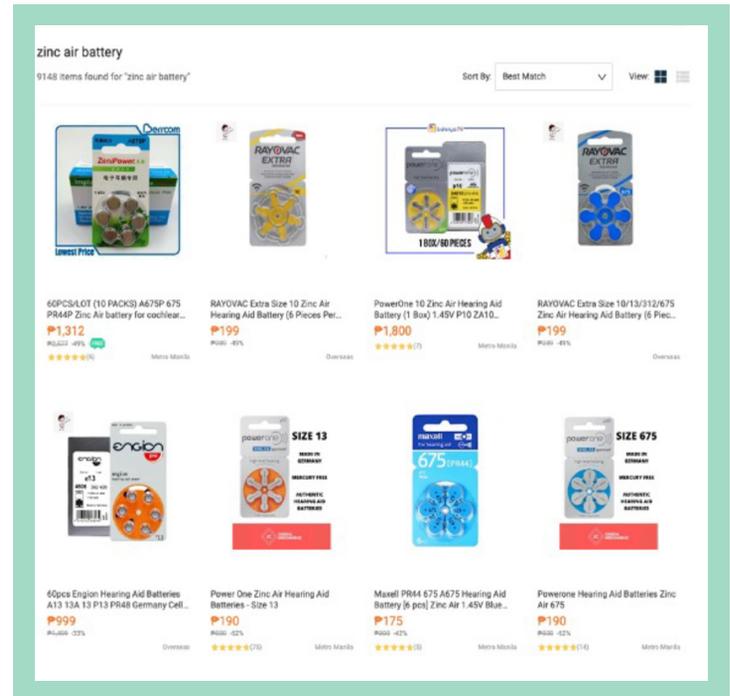


Figure 3: Zinc Air Batteries Available on Lazada

Lamp and Lighting Products

The section on lamp and lighting products focuses on products designed for household use, and might not reflect realities for industrial- or commercial-grade products.

Mercury is used in a variety of lighting products because it contributes to the efficiency and life expectancy of light bulbs.⁴⁴ Mercury when added to lamps forms a vapour which produces light when current is passed through it under a vacuum.⁴⁵ These fluorescent and other mercury-containing bulbs are generally longer-lasting and more energy-efficient than their non-LED counterparts.

Currently, Philippine National Standards (PNS) for mercury-containing lamps require labelling information that warns consumers of mercury content for these products.⁴⁶ The revised CCO on Mercury and Mercury Compounds likewise mandates a 2022 phase-out for mercury-containing lighting products that are not compliant with the Minamata Convention on Mercury guidelines.

Today, mercury-containing light bulbs may still be in use due to their long lifespans which may last between 6 to 10 years.⁴⁷ In 2010, the Asian Development Bank in partnership with the Department of Energy started a \$46 million project to phase out incandescent light bulbs and distribute over 10 million compact fluorescent light bulbs (CFLs),⁴⁸ making the Philippines the first Asian country to phase out inefficient

incandescent light bulbs.

With mercury-containing lamps being a major mercury-added product in Philippine households, a key issue remains the country's lack of capacity to address waste and disposal concerns. In an interview with the DoE, it was highlighted that the lamp waste management facility which the agency spearheaded as part of the Philippine Energy Plan remains closed due to the lack of private sector stakeholders who were willing to take part in managing the facilities as part of the then-planned Extended Producer Responsibility program.

Trade Statistics for Mercury-Containing Lighting Products and Alternatives

In a key informant interview with the DoE, it was noted that the use of mercury-containing lighting products is "self-diminishing" as consumers are starting to shift to mercury-free alternatives. LED products are said to be saturating the market, with local government units such as Baguio City implementing programs to replace public lighting utilities (such as street lighting and indoor luminaires) with LED-based products. Additionally, the DoE reports that there is no manufacturer for household lighting products in the country.

The table below highlights importation statistics for mercury-containing lighting products and their alternatives. The table only presents data for bulbs suitable for household and commercial use and excludes lighting products for use in medical or motor equipment, among others.

Table 12: Importation Data - Lighting Products

Product Category: Lighting Products (Import)								
Commodity Description	2017		2018		2019		2020	
	Quantity	Value (USD)	Q	V	Q	V	Q	V
Mercury vapor lamps	426,862	1,099,379	99,159	868,217	17,771	886,872	5,602	3,373,980
Metal Halide lamps	79	340	0	0	96	18,141	0	0
Neon lamps	53,080	65,142	1,647	5,732	17,288	47,517	11,995	52,857
Fluorescent and Hot Cathode								
• Tubes for CFLs	1,322,979	879,287	440,723	415,821	200,295	310,845	49,705	125,993
• In straight-tube form	23,869,222	16,282,138	791,250	1,545,523	N/A	N/A	N/A	N/A
• In circular form	0	0	0	0	5	140	0	0
• Other forms	182.00	3,348.00	10,133,673	11,463,853	4,599,848	11,285,463	1,118,127	5,929,678
Other fluorescent cold cathode lamps	3,818	6,031.00	286,164	165,459	37,317	91,112	2,932	87,349
Incandescent lamps	0	0	11	6,932	0	0	1	62
Mushroom-shaped (E-type) bulbs partially or fully coated with white powderous materials like titanium dioxide or silica powder ^h	408,123,499	3,697,783	130,006,930	475,515	N/A	N/A	N/A	N/A

The importation data shows a drastic decrease in mercury-containing bulbs. Mercury vapor lamps decreased from 426,862 total imported units in 2017 to just 5,602 in 2020. The same goes for CFLs and other kinds of fluorescent cold cathode lamps. This is considering the spike in imported units for fluorescent cold cathode lamps (increasing from 3,818 in 2017 to 286,164 in 2018) and other forms of fluorescent and hot cathode lamps (increasing from 182 units in 2017 to 10,133,673 in 2018), which saw an increase in importation rates when the products became available and in demand. After the initial spike, both product categories saw steep declines in their importation rates going into 2019 and 2020.

Mushroom-shaped bulbs were noted as mercury-free LED bulbs by the PSA, and this was validated by the PSG. Despite the lack of available reported data for these bulbs from the PSA going into 2019 and 2020, the imported units in 2017 alone (408,123,499) outnumber the total number of reported imports for mercury vapor lamps, fluorescent and hot cathode lamps, and other fluorescent cold cathode lamps from 2017 to 2020. This may be indicative of how the LED market has overtaken their mercury-containing counterparts, as attested to by the DoE. Still, it should be noted that the supply of mercury-

^h E-type bulbs coated in powderous materials are used in the creation of LED bulbs

containing lighting products remains significant, with other forms of fluorescent lamps (non-circular and non-straight tube) showing 1,118,127 imported units in 2020 alone.

The main identified sources for LED bulb importation include China, Taiwan, Hong Kong, Japan, Korea, and Singapore. For mercury-containing devices, the main sources of imports include China, Poland, the USA, Hong Kong, Korea, and Singapore, among others.

Export data for lighting products show that the Philippines exports sodium vapor lamps and has low export values for fluorescent and hot cathode bulbs and parts. Mercury vapor lamps, albeit with incomplete data, reveals high export numbers for 2019 and 2020. For both years, export data for mercury vapor lamps far outweigh the quantity and value of imported lamps and related parts.ⁱ

Data for mushroom-shaped e-type bulbs are again unavailable for certain years. Interestingly, one of the products most significantly exported by the country are incandescent lamps, which are now almost unavailable in local stores due to the shift to more efficient lighting products.⁴⁹

The main export partners for lighting products include countries such as China, Germany, South Korea, Mexico, Taiwan and the USA.

Table 13: Exportation Data - Lighting Products

Product Category: Lighting Products (Export)								
Commodity Description	2017		2018		2019		2020	
	Quantity	Value (USD)	Q	V	Q	V	Q	V
Mercury Vapor Lamps	N/A	N/A	N/A	N/A	100,165	9,600,305	124,306	4,869,137
Sodium Vapor Lamps	0	0	1	341	0	0	0	0
Metal Halide Lamps	250	1,869	96	5,388	2,653	68	0	0
Fluorescent and Hot Cathode								
• Tubes for CFLs	1,795,960	257,447	1,953	53,529	520,000	39,000	3,203,225	405,715
• In straight-tube form	446.00	332.00	0	0	178,750	783	0	0
• In circular form	0	0	219	4,502	0	0	0	0
• Other forms	3,052,500	326,150	600	44,445	106,621	104,347	257,882	176,599
Incandescent lamps	7,583,155	1,625,415	530,612	510,541	19,998,900	2,409,681	5,664,631	2,758,618
Mushroom-shaped (E-type) bulbs partially or fully coated with white powderous materials like titanium dioxide or silica powder ^j	109,779.70	93,675	N/A	N/A	N/A	N/A	N/A	N/A

ⁱ As the DoE notes that there is no known major household lighting manufacturer in the country, these export numbers may very well reflect products for industrial or commercial uses, which are excluded from this section.

^j E-type bulbs coated in powderous materials are used in the creation of LED bulbs

Availability of Mercury-Containing Products and Alternatives from Major Distributors

As identified by the DOE, the two biggest distributors of light bulbs in the country are Firefly and Signify (through subsidiary company Philips).

Philips is a Dutch company founded in 1891. In 1956, Philips Lighting was established in Manila and initially had a manufacturing plant in the Philippines before moving it elsewhere.⁵⁰ In 2016, after being acquired by Signify, the company made a public commitment to push for LED-only lighting products in all buildings, street lighting, and corporate structures by 2030.⁵¹

Firefly Electric and Lighting Corporation was established in 2001 and is the leading lighting solutions company in the Philippines.⁵² Before 2014, LED bulbs sold for as much as P1,200 (around 23USD) before the company introduced more affordable LED bulbs at P120,⁵³ or roughly the same price as mercury-containing counterparts.

The table below outlines the majority of products (excluding smart lightbulbs and novelty bulbs) listed as available on their websites:

Table 14: Available Products - Major Lighting Distributors

PRODUCTS AVAILABLE - MAIN DISTRIBUTORS (LAMPS)					
Category	Firefly ⁵⁴		Category	Signify ⁵⁵ (Philips)	
	Mercury-Containing	Alternatives		Mercury-Containing	Alternatives
HID Lamps	Metal Halide Tubular Lamp	None Listed	HID Lamps	SON-T/SON High Pressure Sodium Lamp	None Listed
				Master HPI-T Plus/HPI Metal Halide Lamps	
				Master CosmoWhite Metal Halide Lamps	
Tube/Batten-Types	Straight Tube Fluorescent	Basic Series T5 Batten	Tube/Batten-Types	TL-D Linear Fluorescent Tube (18 to 36 W)	LED Linear Tube (8 to 16W)
		Circular Tube Fluorescent		Ecolum LED T5 Luminaire	T5 Essential Linear Fluorescent Tube (14 to 28 W)
	Basic/Pro Series LED T8 Tube			TL-D Super 80 Linear Fluorescent Tube (18W)	
	Ecolum LED Tube T8				
	FF Basic LED T5 Tube				
Lamp/Bulb-Types	T5 Fluorescent w/ Electronic Ballast Lamp Set	Basic/Pro Series LED A-Bulb	Lamp/Bulb-Types	Non-integrated Compact Fluorescent (26W)	Li - LED Candle (4 to 5.5W)
	Compact 2U Fluorescent Lamp (5 to 15W)	Basic Series LED 12V DC Water Resistant Bulb			LED Spot (3 to 5W)
	Compact 3U Fluorescent Lamp (18 to 26W)	Ecolum LED Bulb			LED Bulb Dimmable (7 to 7.5W)
	Compact Spiral Fluorescent Lamp (20 to 85W)	Basic/Pro Series LED Globe Lamp			LED Bulb (5 to 15W) with varying shapes, lighting profile, and caps (E14/E27)
		Ecolum/Basic Series LED Capsule			
		Pro Series LED Pin Light			
		Basic Series LED Tubular Lamp			
		LED Candle Bulb			
Basic Series LED Vintage Lamps					

While fluorescent bulbs are still available from both Signify and Firefly, LED bulbs for both companies provide more available sizes, lighting power, and shapes. A key issue, however, is the lack of mercury-free options for HID lamps that are available from both Firefly and Signify. Although the UNEP (Table 4) lists mercury-free HPS lamps as viable alternatives to mercury-containing HID lamps, both the SON-T and the SON sodium models available from Signify contain mercury starting at 16.3 mg for the 72W SON lamp⁵⁶ and 16.3 mg for the 77W SON-T lamp.⁵⁷

Outside of the two major distributors cited by the Department of Energy, there are other significant brands involved in the lighting industry that may provide mercury-free alternatives. Wilcon Depot, the country's leading home construction retail store, launched its LED-only brand of lighting solutions named Alphalux in 2017. The brand provides bulbs, downlights, panel lights, and flood lights built with LED technology.⁵⁸ Similarly, OMNI electrical lighting distributes LED-only lighting products,⁵⁹ including high-powered flood lamps that are potent alternatives for mercury-containing HID.

Availability Through Other Sources

Fluorescent light bulbs are readily available from online sources such as Lazada and Shopee, with both locally available and imported lamps being available for purchase. Still, when filtering the website's results to show top selling products, the majority listed are LED or non-mercury-containing products. This is consistent with the DoE's assertion that

consumers have started to adopt mercury-free lighting in their everyday uses.

The challenge for lighting products remains the lack of mercury-free HID alternatives to HID from both Firefly and Signify, the two top distributors identified by the DoE. The lack of mercury-free HID options from both distributors may influence who are only looking to purchase from them due to brand familiarity. Still, mercury-free alternatives are readily available albeit from other brands. Xenon-based mercury-free HID lamps as well as LED lamps, which are recommended alternatives, are available from other distributors on online selling platforms. Mercury-free sodium vapor lamps, however, are not locally available from major distributors in the country.

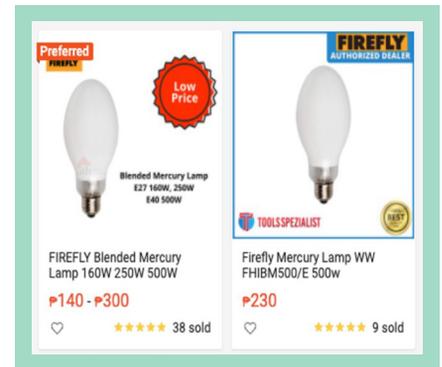


Figure 4: Firefly-branded Mercury Lamps Available on Shopee



Figure 5: High Powered OMNI LED Floodlights as Alternatives to HID

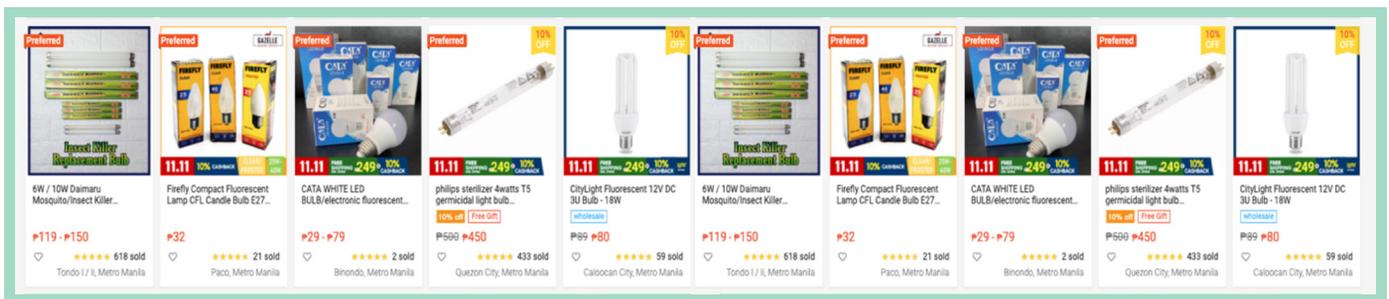


Figure 6: Mercury-Containing Lighting Products on Shopee

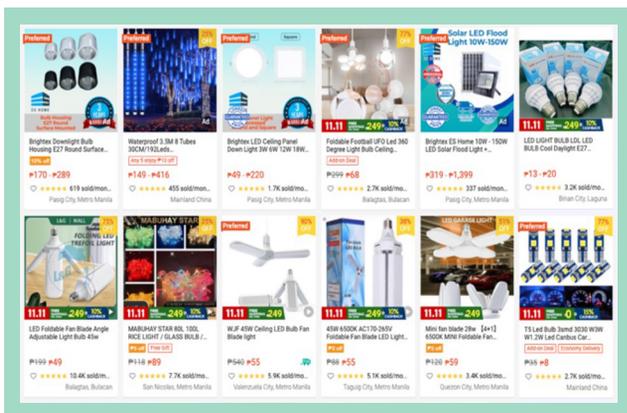


Figure 7: Top-Selling Lighting Products on Shopee

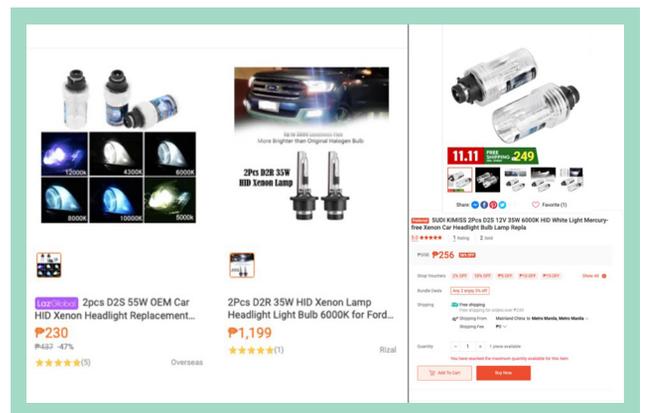


Figure 8: Mercury-Free HID Alternatives on Lazada

Mercury Inventory Data for Batteries, Lamps, and Medical Measuring Devices

With various policies aiming to control the use, trade, and manufacture of mercury-added products, it is vital to provide data regarding mercury emissions and releases that can be attributed to them. This data will also be important to validate the trade data collected from the Philippine Statistics Authority. For example, low import and export data should correspond to low mercury inputs per product category. Inconsistency between these information would mean that one or both data sets may be inaccurate.

Summarized in this section are the relevant information regarding batteries, lamps, and medical measuring devices as presented in the 2018 Philippine Mercury Inventory

Report.⁶⁰ As per the report, the country emits and releases an average of 270,379 kg of mercury per year.

The report lists consumer products with intentional use of mercury as the second leading source of emissions and releases into the environment, albeit at only 13% compared to the 78% attributed to primary metal production. Of this 13%, the inventory highlights the importation and consumption of whitening and bleaching products as the leading source of emissions and releases. Consumer products with intentional use of mercury emit and release an estimated 35,904.87 kg per year.

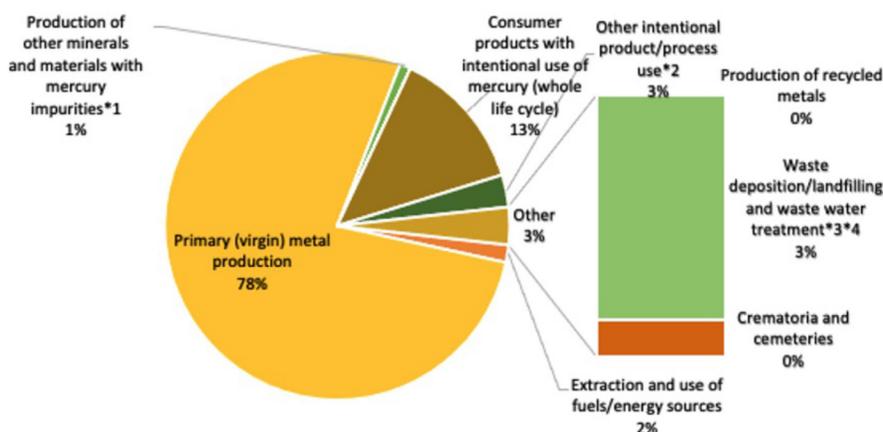


Figure 9: Summary of Mercury Inputs in the Philippines

The table below summarizes the total emissions and releases attributed to medical measuring devices, batteries, and lighting products, as highlighted in the report. In total, these product categories account for only 5.4% of the total emissions and releases attributed to consumer products with intentional use of mercury, or only around 0.7% of the total releases across all identified input categories.

Table 15: Mercury Inputs for Priority Products

Category	Mercury Input, Kg/year	Percentage (consumer products)	Percentage (total mercury inputs)
Medical Measuring Devices (Total)	622.3	1.73%	0.23%
• Thermometers	• 249.7	• 0.7%	• 0.092%
• Sphygmomanometers	• 372.6	• 1.037%	• 0.14%
Batteries	347.27	0.97%	0.13%
Lighting Products	973.5	2.7%	0.36%
Total	1,943.07	5.41%	0.72%

k Percentage of mercury inputs per product in comparison with sub-category "consumer products with intentional use of mercury"
 l Percentage of mercury inputs per product in comparison with total mercury inputs across all input categories

Medical Measuring Devices

The 2018 Philippine Mercury Inventory Report asserts that due to the ban on mercury-containing medical measuring devices in healthcare facilities, there are no significant imports for thermometers and sphygmomanometers in the country. This is also consistent with the findings of the previous chapter, where trade data has shown that the market has shifted to digital alternatives.

The mercury inventory report utilizes thermometer and sphygmomanometer stocks to calculate annual mercury inputs due to the lack of imports for mercury-containing medical measuring devices. The use and disposal of blood pressure gauges or sphygmomanometers account for an annual mercury input of 372.6 kg per year while thermometers have an annual mercury input of 249.7 kg per year. Combined, sphygmomanometers and thermometers account for only 1.73% of the total emissions and releases attributed to consumer products with intentional use of mercury.

Sphygmomanometers alone account for mercury inputs that are slightly above those of batteries. However, it is important to note that this data is again based on stock devices and may not be indicative of an issue on availability and demand for mercury-containing devices.

Batteries

The 2018 Philippine Mercury Inventory Report covers mercuric oxide, silver oxide, zinc air, and alkaline button cell batteries. Mercury containing batteries account for an estimated mercury input of 347.27 kg per year, or 0.97% of the total emissions and releases attributed to consumer products with intentional use of mercury.

The low number of attributed mercury inputs to batteries is consistent with the previous chapter, which asserts that most battery products imported to the Philippines are mercury-free lithium batteries. Furthermore, when assessing the products available through major battery distributors in the country, it should be highlighted that they have shifted to mercury-free alternatives for silver oxide, zinc air, and alkaline batteries.

Lighting Products

The 2018 Philippine Mercury Inventory Report utilizes household and commercial disposal rates as well as population growth rate to estimate mercury inputs from the lighting sector. Lighting products have an estimated annual mercury input of 973.5 kg per year, or around 2.7% of the total emissions and releases attributed to consumer products with intentional use of mercury.

Of the three focus product categories in this report, mercury-containing lamps are contributing the most to mercury emissions and releases. This may be due to several factors including the high demand for lighting products as well as the average mercury content per bulb. Furthermore, as reported in the previous chapter, fluorescent bulbs and other mercury-containing lighting products are still widely available despite the demand diminishing in favor of LED alternatives. Mercury-free HID lamps in particular remain a concern, with the two major suppliers of lighting products in the Philippines only selling mercury-containing HIDs.

Still, it should be reiterated that the majority of household and consumer-level lighting products sold and available are of LED varieties. What is highlighted then by the relatively high mercury inputs from lighting products is the capacity of the country to address eventual waste disposal and management for mercury-containing lighting equipment.

Another source of data will be DENR EMB – amount of mercury and mercury-free alternatives that are being disposed by TSD facilities; there may be a trend here (e.g. decreasing mercury, increasing mercury-free products)

Conclusions and Recommendations

As highlighted in the Philippine Minamata Initial Assessment Report⁶¹ and the accompanying Philippine Mercury Inventory Report,⁶² batteries, lamps, and medical measuring devices are assumed to only comprise a small percentage of consumer products with mercury intentionally added.

The shift of healthcare facilities to mercury-free medical measuring devices has primarily influenced the importation of mercury-containing thermometers and sphygmomanometers. From 2017 to 2020, there were 0 reported imports for thermometers that contained mercury. This is validated by the Philippine Mercury Inventory Report which notes that import numbers for both devices are insignificant. However, thermometers and sphygmomanometers that contain may still be purchased from online trading platforms from overseas sources such as China.

Mercury-containing button cell batteries in the Philippines are also difficult to locate. The major brands who are distributing batteries have all shifted to mercury-free alternatives, as listed on their websites. When assessing the availability of button cell batteries on online trading platforms, virtually all results (even from minor brands imported from foreign countries) show mercury-free labels. As such, it can be concluded that the availability of mercury-free batteries in the country is enough to supply our needs when the phase-out arrives.

Finally, mercury-containing lamps are considered the product category that has the biggest risks. Aside from contributing the most mercury inputs (as discussed in the Mercury Inventory Report) among the three focus categories, mercury-containing fluorescent and HID lamps are still widely available even from the two major brands that distribute lighting products. However, it should also be noted that alternative products are also more available, and upcoming policies such as *“the new technical regulation concerning the mandatory certification of mercury-added products”* from the Department of Trade and Industry (DTI) will serve to promote the shift to mercury-free alternatives.

In conclusion, mercury-free alternatives for batteries, lamps, and medical measuring devices are readily available in the Philippine market. For batteries and medical measuring devices, consumers have already shifted primarily to safer alternatives. Consumers are also gradually shifting to mercury-free lighting products, but the continued availability of mercury-containing lamps remains a challenge.

Recommendations

Based on the findings of the study, it is recommended that the government and relevant agencies continue to strictly enforce our policies concerning MAPs. The recent progress in the development of relevant policies from the Food and Drug Administration (on thermometers and sphygmomanometers) as well as the DTI (on MAPs) are indicative of the government’s willingness to pursue a multi-stakeholder approach to regulating MAPs.

It is recommended that awareness-building be prioritized by the government targeting both consumers and distributors. In a public consultation held by the Bureau of Philippine Standards (BPS-DTI), a number of distributors were unaware of the phase-out listed in the Revised CCO for Mercury. It is imperative that distributors and manufacturers especially for lighting products are engaged and with and educated regarding mercury and its associated risks as well as relevant policies and the Minamata Convention on Mercury.

With mercury-added lighting products (and to some extent, thermometers and sphygmomanometers) still available in the market, the government is also recommended to explore awareness-raising campaigns that aim to educate consumers about the benefits of shifting to safer alternatives. Enforcement of proper labelling for products should also be strengthened in accordance with existing policies, to ensure that consumers are informed regarding the risks associated with the products that they consume.

Finally, coordination with primary trading platforms is encouraged. Respective government agencies are excellent at regulating domestic traders, but some mercury-containing products still appear on trading platforms from time to time. Once reported to authorities, these products are taken down, but this process can at times be cyclic. Improved coordination with trading platforms primary in building their capacities to filter products that can be sold on their platforms may be a step towards preventing these products from being available in the first place.

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