MARKET STUDY ON THE AVAILABILITY OF MERCURY-FREE PRODUCTS IN SAINT KITTS AND NEVIS

Technical Report

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Market Study on the Availability of Mercury-free Products in Saint Kitts & Nevis

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Prepared for: The European Environmental Bureau / Zero Mercury Working Group, the Saint Kitts and Nevis Bureau of Standards, Ministry of International Trade, Industry and Commerce and Consumer Affairs and, the Ministry of Sustainable Development, Environment, Climate Action and Constituency Empowerment

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List of Acronyms

ACP	Africa, Caribbean, and the Pacific (regions)
ASGM	Artisanal and Small-scale Gold Mining
ASYCUDA	Automated Systems for Customs Data
BCRC-Caribbean	Basel Convention Regional Centre- Caribbean
BRI	Biodiversity Research Institute
CARICOM	Caribbean Community
CFLs	Compact Fluorescent Lamps
CCFLs	Cold Cathode Fluorescent Lamps
CLiC	Clean Lighting Coalition
COP-4	Fourth Meeting of the Conference of the Parties to the Minamata Convention on Mercury
CRMMN	Caribbean Regional Mercury Monitoring Network
EEB	European Environmental Bureau
EEFLs	External Electrode Fluorescent Lamps
EU	European Union
FAO	Food and Agricultural Organisation
GEF	The Global Environment Facility
GHS	Global Harmonised System for Classification and Labelling of Chemicals
Hg	mercury
HIDLs	High Intensity Discharge Lamps
HPMV	High Pressure Mercury Vapor
HS	Harmonised System
IISD	The International Institute for Sustainable Development
IMERC	The Interstate Mercury Education and Reduction Clearinghouse
ISLANDS	Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (Programme)

LED	Light Emitting Diode
LFLs	Linear Fluorescent Lamps
MAPs	Mercury-added products
MEAs	Multilateral Environmental Agreements
MeHg	Methylmercury
MIA	Minamata Initial Assessment
NEP	National Environmental Policy
NGOs	Non-Governmental Organisations
NWG	National Working Group
OACPS	Organisation of African, Caribbean and Pacific States
SIDS	Small Island Developing States
SKNBS	Saint Kitts and Nevis Bureau of Standards
SOPs	Standard Operating Procedures
UNEP	United Nations Environment Programme
USA	United States of America
WHO	World Health Organisation
XRF	X-ray fluorescence spectroscopy
ZMWG	Zero Mercury Working Group

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About This Document

This report was developed under the project, “Phasing out of Mercury-Added Products in Saint Kitts and Nevis” as part of initiatives being conducted by the European Environmental Bureau (EEB) in cooperation with the Zero Mercury Working Group (ZMWG). This project is being conducted and funded by the Africa, Caribbean, and the Pacific (ACP) Multilateral Environmental Agreements (MEAs) programme. The Saint Kitts & Nevis Bureau of Standards (SKNBS) functions as the National Focal Point.

Sole responsibility for the contents of this document lies with the Consultants who developed the report.

Stakeholder consultations with private sector companies and individual professionals were conducted through surveys and interviews. In order to maintain confidentiality, these stakeholders and details on their activities related to the market study conducted are not provided. Labelling codes have been assigned for reference of certain stakeholders where necessary.

Public sector institutions have been identified although individual persons from these institutions remain unnamed in the report.

Every effort has been made to ensure that the data provided in the report does not cause commercial or other prejudice to any stakeholder.

Specific products or brands mentioned in this report should not be construed as providing any endorsement or marketing advantage.

The Consultants thank the designated representatives from EEB/ZMWG, the SKNBS and the National Working Group assigned to this project for their support and feedback provided for the development of this report.

Executive Summary

Project Background

Mercury (chemical symbol: Hg) is a naturally occurring element that has been utilised by humans for centuries in a variety of processes but is also among the top ten (10) chemicals or groups of chemicals of major health concern.

Recognising the need to address the negative effects of mercury, the Minamata Convention on Mercury was developed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds by, in part, regulating, *inter alia*, the supply, sources, trade, storage and disposal of mercury and its compounds; mercury-added products (MAPs) and processes; mercury waste; and the emissions and releases of mercury. The Minamata Convention entered into force on August 16, 2017, with 141 Parties to date (*as of May 2023*). Parties to the Minamata Convention on Mercury are required to meet the obligations set forth in the Convention's text and annexes.

Under Article 2 of the Minamata Convention, MAPs are defined as a "product or product component that contains mercury or a mercury compound that was intentionally added". Article 4 outlines measures to phase out or, in the case of dental amalgam, phase down the manufacture, import and/or export of certain MAPs.

The Government of the Saint Kitts & Nevis became a Party to the Minamata Convention on Mercury on 24 May 2017 and has participated in several initiatives in recent years to better meet its obligations. These initiatives have included projects such as (but not limited to) those listed below relevant to the management of MAPs:

- Caribbean Development Bank, Street Lighting Retrofitting Project for Saint Kitts and Nevis: Launched in 2016 to replace street lighting with Light Emitting Diodes (LED) bulbs to reduce the Government of Saint Kitts energy bill by 2023.
- "Development of Minamata Initial Assessment in the Caribbean (Jamaica, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago)" which led to the completion of a National Minamata Initial Assessment Report for Saint Kitts and Nevis in 2018 that included a detailed national mercury inventory, regulatory framework assessment, identification of potential mercury hotspots and communication strategy to raise awareness on mercury issues.
- "Identifying Feasible Strategies for the Environmentally Sound Disposal of Spent Lighting Products in the Caribbean" (2019) which assessed the current national disposal management practices for spent mercury-added lighting products using draft

environmentally sound management manuals developed under the Basel Convention for the Control of Transboundary Movement of Hazardous Wastes and their Disposal.

This project was developed as part of the European Environmental Bureau (EEB) / Zero Mercury Working Group (ZMWG)'s activities to support countries under the Africa, Caribbean, and the Pacific (ACP) Multilateral Environmental Agreements (MEAs) programme. It aims to develop strategies to reduce the use and releases of elemental mercury and MAPs listed in Article 4 of the Minamata Convention in the context of the ACP MEAs programme.

The overall programme is a partnership between the European Union (EU), United Nations Environment Programme (UNEP), Food and Agricultural Organisation of the United Nations (FAO), and the Organisation of African, Caribbean and Pacific States (OACPS). The project is being executed nationally in collaboration with the SKNBS.

As part of the project's activities, this market study is being conducted to determine the availability, accessibility, efficacy, and technical feasibility of replacing MAPs with alternatives that comply with Article 4 'Mercury-Added Products' of the Minamata Convention on Mercury. Due to the available data and resources available for the market study, the targeted products under this study include:

1. Lighting Devices
2. Switches, Relays and Thermostats
3. Medical Measuring Devices (Thermometers and Blood Pressure Gauges)
4. Dental Fillings

This market study was conducted within the context of the relevant regulatory framework of Saint Kitts & Nevis and in consultation with stakeholders. Surveys were also developed and distributed to gather feedback from public and private sector organisations/companies. While various measures were taken to encourage stakeholder participation for surveys, responses were generally low. Desktop research was conducted to further support the assessment.

Findings and Analysis of the Market Study on Target MAPs

Table 1 provides a summary of the results of the market study conducted for the targeted consumer products.

Table 1: Summary Assessment of the Availability of Minamata Convention-compliant Alternative Products to MAPs

Lighting Devices	
Type of Product	Light Emitting Diode (LED) Lighting Devices

Availability	LEDs are available on the national market. The Government of Saint Kitts and Nevis have embarked on funded initiatives to replace streetlighting and floodlights with mercury free LED alternatives.
Efficacy/Reliability	LEDs do not contain mercury and their use results in lower energy consumption which subsequently results in lower carbon emissions (in comparison to mercury-added or other types of light bulbs). LEDs demonstrate higher brightness (lumens) and have a longer functional lifespan than mercury-added lighting products.
Electrical Switches, Relays and Thermostats	
Type of Product	Mercury-free switches; mercury-free relays; electromechanical or digital thermostats
Availability	No local data could be found to confirm availability as typically, import data does not currently differentiate between mercury-added and mercury free types and feedback from stakeholders was inconclusive (since these products are often components within larger products), but global trends indicate that mercury-free alternatives have become widely available over the past two (2) decades.
Efficacy/Reliability	While the specific suitability of switches, relays and thermostats vary across multiple potential applications, research indicates that mercury-free switches, relays and thermostats are globally available, reliable and adequate for a variety of functions.
Medical Measuring Devices – Thermometers	
Type of Product	Mercury-free thermometers may include alcohol or infrared types, but for clinical use, digital thermometers are the most well-known.
Availability	Mercury-free thermometers are the main types of thermometers in use across all relevant sectors and appear to be predominantly available on the global and local market in both the public and private sectors.
Efficacy/Reliability	Extensive research by the WHO and other recognised bodies have concluded that digital thermometers have a high efficacy (in comparison to mercury-added thermometers and other types).
Medical Measuring Devices – Blood Pressure Gauges	
Type of Product	Aneroid sphygmomanometers and several types of automated (electronic) blood pressure gauges.

	(Note: some types may contain small concentrations of mercury. Currently, these are not restricted under the Minamata Convention).
Availability	• Minamata Convention-compliant blood pressure measuring devices are the predominant types available on the global and local market. • Globally, the manufacture of these MAPs has been reduced due to the increased preference for mercury-free and technologically advanced types as well as the phase-out efforts of Parties under the Minamata Convention on Mercury.
Efficacy/Reliability	Research by the WHO concluded that mercury-free validated automatic blood pressure machines produce more accurate and consistent measurements (in comparison to mercury-added measuring devices).
Dental Restoration Materials (Fillings)	
Type of Product	Composite (resin) fillings
Availability	• Composite fillings for dental restoration have become the predominant preference on the global and local market for many years. The majority of dentists have indicated that their dental restoration materials used are mercury-free.
Efficacy/Reliability	• Global assessments on technical efficacy of composite fillings have concluded that they exhibit satisfactory mechanical properties, require less preparation for use and preferred by patients due to aesthetics (in comparison to dental amalgam fillings). • Providing adequate training of dental practitioners in the preparation and placement of composite fillings will ensure their effectiveness and durability.
• *NOTE: An economic analysis was not conducted under this report as the alternatives are already common on the global market and are generally considered relatively affordable. The economic feasibility of mercury-free products is also made more evident when the cost of ensuring environmentally sound disposal of MAPs is considered.*	

Conclusions and Recommendations to ensure the implementation of Article 4 of the Minamata Convention on Mercury.

When overall efficacy, availability and accessibility is considered, the replacement of MAPs with Minamata Convention-compliant products is determined to be both feasible and generally favoured due to the less or non-toxic nature of the mercury-free alternatives. Many of the global manufacturers of MAPs have already committed to the production of mercury free

alternatives. In addition, the replacement of MAPs with mercury free alternatives, is already an ongoing process in Saint Kitts and Nevis. For the complete phase out of the assessed MAPs and for the continued phase down of dental amalgam, recommendations are made below.

I. **Enhancement of the National Regulatory Framework:**

MAPs are not manufactured or exported nationally. In order to enhance the prohibition of imports of MAPs, it is recommended that the Fourth Schedule, "Prohibitions and Restrictions" of the Customs Act, Chapter 20.04 be amended to include MAPs as listed under Part 1, Annex A of the Minamata Convention on Mercury.

The adoption of Green Procurement Policies by the national government has also been noted as a priority for action under their ongoing National Action Plan for mercury management.

II. **Development of a Communication and Coordination Strategy to Promote Mercury-free Alternative Products:**

Under the MIA project conducted in Saint Kitts and Nevis, several awareness raising materials were developed to educate the public and key stakeholders in the public and private sector about the benefits of the Minamata Convention on Mercury, its obligations and the need to phase out MAPs.

Materials developed[1] included:

1. Informational National Video, "Managing Mercury in Saint Kitts and Nevis" available at: Managing Mercury in Saint Kitts and Nevis - YouTube
2. Informational Caribbean Video, "Managing Mercury in the Caribbean" available at: Managing Mercury in the Caribbean - YouTube (full version) and Managing Mercury in the Caribbean - Condensed - YouTube (condensed version).
3. Non-technical Summary Document "The State of Mercury in Saint Kitts and Nevis"
4. Awareness Posters/Infographics on various mercury-related topics such as, but not limited to:
    a. Mercury in Everyday Products
    b. Mercury and Health
    c. Mercury in Medical and Industrial Devices

Further to this, under the regional "Development of Minamata Initial Assessments in the Caribbean" projects executed by the BCRC-Caribbean, an updated Communications Strategy

[1] Available at: MIA-1 Awareness Raising Material – BCRC Caribbean (bcrc-caribbean.org)

and Guidance Document to enhance awareness of the Minamata Convention on Mercury was made available to the Saint Kitts and Nevis Bureau of Standards in 2020 which included further material (available at: MIA-2 Awareness Raising Material – BCRC Caribbean (bcrc-caribbean.org).

The use of these materials and strategies facilitated through the BCRC-Caribbean can be adapted to develop an updated awareness campaign that highlights the engagement of the public as well as, relevant businesses and key stakeholders in the medical and dental sector.

Coordination of public awareness efforts between government stakeholders and private stakeholders in the relevant manufacturing, retail and medical sectors is essential to ensure clear communication and follow-through for the phase-out of MAPs and replacement with mercury-free alternative products.

III. Coordination with Related Projects and Initiatives for the Overall Protection of Human Health and the Environment:

- Saint Kitts and Nevis is a participating country under the global programme, "GEF ISLANDS" being executed regionally by the BCRC-Caribbean. This project aims to strengthen countries' abilities to control the flow of chemicals, products, and materials into their territories and to unlock resources for long term management of chemicals and wastes including integrated chemicals and wastes management in SIDS. The project targets among others the management of Persistent Organic Pollutants and mercury. Through this project, the enhancement of national regulatory framework and training of customs officials as needed, to prevent the import of MAPs and other targeted chemicals/products will be implemented. Disposal possibilities for mercury added products waste will also be examined.

- Under the project, "Technical assistance to Parties to implement Articles 3, 4, 10 and 11 of the Minamata Convention on interim storage, disposal of waste in mercury-added products using guidelines from the Minamata Convention" coordinated by the Caribbean Community (CARICOM) Secretariat, a training programme to regional/sub-regional authorities on the environmentally sound management of waste MAPs was initiated. A training manual was developed that is available for participating countries, including Saint Kitts and Nevis.

- Saint Kitts and Nevis, through the SKNBS, is currently involved in the overall strengthening of the regional laboratory capacities for testing of products to identify or quantify mercury content under the Caribbean Regional Mercury Monitoring Network (CRMMN) initiative developed by the Biodiversity Research Institute (BRI) and the Department of Analytical

Services in Antigua and Barbuda. Activities for the initiative are ongoing and regular updates should be provided to the Government to monitor progress.

- Sharing of the outcomes and progress of the Street Lighting Retrofitting Project, through which potentially mercury-added lighting is replaced with LED alternatives, will strengthen the guidance and communication efforts for the overall promotion of mercury-free alternative products.

Chapter 1 – Introduction

1.1 Why is Mercury an Issue?

Mercury (chemical symbol: Hg) is a naturally occurring element that has been utilised by humans for centuries in a variety of processes such as precious metal mining and amalgamation due to its unique properties. For example, mercury is temperature and pressure sensitive, is a good electricity conductor and forms alloys with other metals. Despite its useful properties, mercury is also highly toxic and can pose a serious threat to human health and the environment. According to the World Health Organisation (WHO), mercury is among the top ten (10) chemicals or groups of chemicals of major health concern (WHO, 2017).

Mercury can be released to the environment through natural activities such as volcanic eruptions, or through anthropogenic activities. It has been estimated that 10% of mercury emissions to the atmosphere occur from natural sources, while anthropogenic sources can account for 30%. The remaining 60% of emissions are due to re-emissions of mercury already in the environment, mostly because of previous human activity (UNEP, 2019a). Recent global mercury inventory emissions have estimated that the largest source of mercury releases is due to Artisanal and Small-scale Gold Mining (ASGM) as liquid mercury is often directly used in the process. Although the ASGM sector is the largest source of mercury releases, the most commonly occurring source of mercury releases locally is due to the disposal of mercury-added products (MAPs) which accounted for approximately 7% of global mercury releases and was noted to occur in most countries worldwide (UNEP, 2019a).

Once released, mercury cannot be destroyed but is cycled through the air, land, and water. Mercury exists in three (3) forms:

1. Elemental or metallic mercury- this form is liquid at room temperature and is used in activities such as ASGM practices, some industrial processes and can be found as a component in products including but not limited to thermometers, dental amalgam, fluorescent light bulbs, and some electrical switches. If there are breakages, spills or poor maintenance of these products, mercury vapours may be released to the air. Elemental mercury may be also emitted to the air from processes when fossil fuels are burned. Once inhaled, elemental mercury can be converted to inorganic mercury in the body which can cause harmful effects on the nervous, digestive, respiratory, renal and immune systems, and may be fatal depending on the level and length of exposure. The human health effects from exposure to elemental mercury in the general environment are still unknown.

2. Inorganic mercury compounds - formed when mercury combines with other elements, such as sulphur or oxygen, to form compounds or salts. Inorganic compounds can occur naturally or through man-made activities for use in some industrial processes such as vinyl chloride monomer production. Inorganic mercury compounds have been used in some skin-lightening products as they inhibit the formation of melanin. Exposure to inorganic mercury compounds may occur through inhalation of vapours by persons who work in locations where the compounds are used. If ingested in large amounts, some inorganic mercury compounds can be irritating and corrosive to the skin, eyes and gastrointestinal tract, and may induce kidney toxicity. If repeatedly ingested or applied to the skin over extended periods of time, some inorganic mercury compounds can result in long-term effects such as neurological disturbances, skin rashes and kidney abnormalities.
3. Organic mercury compounds- formed when mercury bonds with carbon to form compounds such as methylmercury (MeHg). In water or soil, some microscopic organisms can convert elemental or inorganic mercury to the organic mercury compound, MeHg which may bioaccumulate up the food chain. Human exposure to MeHg commonly occurs through the consumption of certain fish or shellfish contaminated with MeHg over a period of time. Significant exposure to MeHg can result in serious health implications including neurological damage. The most vulnerable populations to MeHg contamination include children and pregnant or breastfeeding women as MeHg can pass through the placenta and breastmilk. Infants born to women with mercury poisoning have been found to have serious health issues such as, developmental abnormalities and cerebral palsy (WHO, 2017 and Centre for Disease Control and Prevention, 2017).

1.2 The Minamata Convention on Mercury

Recognising that mercury is a chemical of global concern, its persistence in the environment, its ability to bioaccumulate and its significant negative effects on human health and the environment, the Minamata Convention on Mercury was adopted, ratified, and is currently being implemented. This global treaty aims to protect human health and the environment from the adverse effects of anthropogenic emissions and releases of mercury and mercury compounds, in part, by regulating, *inter alia*, the supply, sources, trade, storage and disposal of mercury and its compounds; MAPs and processes; mercury waste; and the emissions and releases of mercury.

The text of the Minamata Convention was adopted on October 10, 2013, and the Convention entered into force on August 16, 2017, with 141 Parties to date (*as of May 2023*). Parties to

the Minamata Convention on Mercury are required to meet the obligations set forth in the Convention's text and annexes.

Under Article 2 of the Minamata Convention, MAPs are defined as a "product or product component that contains mercury or a mercury compound that was intentionally added". Article 4 outlines measures to phase out or, in some cases, phase down the manufacture, import and/or export of certain MAPs (f*urther discussed in Chapter 2 of this report*).

1.3 Mercury Activities in Saint Kitts and Nevis

Based on a desktop review of Saint Kitts and Nevis the government is working towards meeting its obligations to phase out mercury added products in accordance with the Minamata Convention. Currently, the Saint Kitts and Nevis Bureau of Standards are developing policies geared towards the phase out of mercury added products in lighting devices, dental amalgam, and medical measuring devices. Furthermore, through awareness initiatives both the private and public sector is importing fewer mercury added products.

Although there have been limited initiatives to directly reduce the use and importation of mercury products, the Government of Saint Kitts & Nevis has participated in several regional activities to build their capacity in mercury reduction.

These projects include:

- "Development of Minamata Initial Assessment in the Caribbean (Jamaica, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago)" which led to the completion of a National Minamata Initial Assessment Report for Saint Kitts and Nevis in 2018 that included a detailed national mercury inventory, regulatory framework assessment, identification of potential mercury hotspots and communication strategy to raise awareness on mercury issues.
- "Identifying Feasible Strategies for the Environmentally Sound Disposal of Spent Lighting Products in the Caribbean" (2019) which assessed the current national disposal management practices for spent mercury-added lighting products using draft environmentally sound management manuals developed under the Basel Convention for the Control of Transboundary Movement of Hazardous Wastes and their Disposal.
- "Global Mercury Hair Monitoring in Women of Child-bearing Age in Small Island Developing States Pilot Project" (2018) which aimed to promote global mercury monitoring efforts in humans to raise awareness on mercury pollution (Bell, et. Al., 2019).
- Caribbean Development Bank, Street Lighting Retrofitting Project for Saint Kitts and Nevis was initially launched in 2016 to replace street lighting with LED bulbs to reduce the

Government of Saint Kitts energy bill to 44 per cent, by 2019. Following a pause in the project, activities are expected to be completed by the end of 2023. Activities include the procurement of LED streetlights and sporting field flood lights; replacement of existing High Pressure Sodium and Metal Halide Lamps with LED alternatives and; the environmentally sound disposal of disused lamps.

- The "Technical assistance to Parties to implement Articles 3, 4, 10 and 11 of the Minamata Convention on interim storage, disposal of waste in mercury-added products using guidelines from the Minamata Convention" coordinated by the Caribbean Community (CARICOM) Secretariat aimed to develop a training programme to regional/sub-regional authorities on the environmentally sound management of waste MAPs. A training manual was developed in 2021 that is available for participating countries which include Saint Kitts and Nevis.
- "Fish Mercury Biomonitoring in the Caribbean Region" (2019) in which mercury concentrations in samples of specific species of fish were analysed to provide the Caribbean region with data that can be utilised as the basis for future mercury biomonitoring initiatives that will be able to guide mercury hotspot identification and the development of consumption guidelines for local fish species (Evers and Sunderland, 2019).
- The Caribbean Regional Mercury Monitoring Network (CRMMN) which is currently ongoing and aims to assist Caribbean countries to meet the obligations of the Minamata Convention through the development of an integrated network of laboratories that will build the capacity for mercury testing in products and the biota (Evers and Burton, 2022).

- The global programme under the Global Environment Facility (GEF), Implementing Sustainable Low and Non-Chemicals Development in Small Island Developing States (ISLANDS) is being executed regionally by the Basel Convention Regional Centre-Caribbean (BCRC-Caribbean) and aims to strengthen countries' abilities to control the flow of chemicals, products and materials into their territories and to unlock resources for long term management of chemicals and wastes including integrated chemicals and wastes management in SIDS. The project targets among others the management of Persistent Organic Pollutants and mercury. Through this project, the enhancement of national regulatory framework and training of Customs officials as needed, to prevent the import of MAPs and other targeted chemicals/products will be implemented. Disposal possibilities for mercury added products waste will also be examined.

1.4 Mercury-added Products under the Minamata Convention on Mercury

Article 4 ‘Mercury-added products’ of the Minamata Convention on Mercury restricts the manufacture, import and export of certain MAPs (UNEP, 2021a). Annex A Part I of the Minamata Convention provides a listing of MAPs that Parties are obligated to phase out and phase out dates.

In terms of dental amalgam fillings, Parties are obligated to take several measures for the phase down of dental amalgam. These measures are included in Annex A Part II of the Minamata Convention.

At the Fourth Meeting of the Conference of Parties of the Minamata Convention on Mercury (COP-4) held in 2021-2022, Annex A of the Minamata Convention was reviewed and amended to include further obligations regarding MAPs. Table 2 provides a summary of the products regulated under Annex A inclusive of the COP-4 amendments, and the status of mercury-free alternatives currently available on the global market.

Table 2: Provisions for Mercury-Added Products Under Annex A of the Minamata Convention and a Summary on Mercury-free Alternatives Available (*Lennett and Gutierrez, 2018; UNEP, 2019b; UNEP, 2021a; IISD, 2022;)*

Product Category	Mercury Added Product to be phased out of manufacture, import and export	Status of Mercury-free Alternative Products
Batteries	Mercury-added batteries, except for button zinc silver oxide batteries with a mercury content < 2% and button zinc air batteries with a mercury content < 2% (**phase-out date: 2020**)	*Most batteries manufactured globally are already mercury free and widely available in Saint Kitts & Nevis*
Switches and Relays	Mercury-added 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 (**phase-out date: 2020**)	*Most switches and relays manufactured globally are already mercury free and are expected to be widely available in Saint Kitts & Nevis.*
Lighting Devices	Compact fluorescent lamps (CFLs) for general lighting purposes that are: ● ≤ 30 watts with a mercury content exceeding 5 mg per lamp burner (**phase-out date: 2020**) ● ≤ 30 watts with a mercury content not exceeding 5 mg per lamp burner (**phase-out date: 2025**)[2]	*Light Emitting Diodes (LEDs) or other technologies are widely available (globally and in Saint Kitts & Nevis.) and are increasingly replacing mercury-added lighting devices.*
	Linear fluorescent lamps (LFLs) for general lighting purposes (**phase-out date: 2020**): (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	
	High pressure mercury vapour lamps (HPMV) for general lighting purposes (**phase-out date: 2020**)	

[2] As per COP-4 amendments.

Product Category	Mercury Added Product to be phased out of manufacture, import and export	Status of Mercury-free Alternative Products
	Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays (**phase-out date: 2020**): (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 *NOTE: CCFLs and EEFLs containing mercury of all lengths for electronic displays not already phased out are expected to be phased out by **2025**[3].	
Measuring Devices	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 (**phase-out date: 2020**): (a) barometers (b) hygrometers (c) manometers (d) thermometers (e) sphygmomanometers	*Mercury-free alternatives (digital etc.) are already widely available and popular on the global market.*
Cosmetics	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 (**phase-out date: 2020**)	*Many countries have banned the sale of mercury in cosmetics, but the larger challenge is effective enforcement. Furthermore online sales of illegal high mercury products continues, and*

Product Category	Mercury Added Product to be phased out of manufacture, import and export	Status of Mercury-free Alternative Products
		this is another issue that needs major attention.
Miscellaneous	Mercury-added pesticides, biocides and topical antiseptics (**phase-out date: 2020**)	*Mercury use in pesticides, biocides, and topical antiseptics is already banned in many countries.*
	The following devices should be **phased out by 2025**[3]: ● strain gauges used in plethysmographs ● melt pressure transducers, melt pressure transmitters, and melt pressure sensors, except those installed in large-scale equipment or those used for high precision measurement, where no suitable mercury-free alternative is available. ● mercury vacuum pumps ● tyre balancers and wheel weights ● photographic film and paper ● propellant for satellites and spacecraft	*Mercury-free alternatives are already widely available and popular on the global and local markets.*
Dental Amalgam Provisions Under Annex A Part II of the Minamata Convention requiring Parties to adopt 2 or more Phase Down Provisions		
Dental Amalgam Provisions		**Mercury-free Alternatives**
Phase Down Provisions:		*Composite (resin) fillings are already widely*

Product Category	Mercury Added Product to be phased out of manufacture, import and export	Status of Mercury-free Alternative Products
Measures to be taken by a Party to phase down the use of dental amalgam shall take into account the Party's domestic circumstances and relevant international guidance and shall include two or more of the measures from the following list: (i) Setting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration; (ii) Setting national objectives aiming at minimizing its use; (iii) Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration; (iv) Promoting research and development of quality mercury-free materials for dental restoration; (v) Encouraging representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices; (vi) Discouraging insurance policies and programmes that favour dental amalgam use over mercury-free dental restoration; (vii) Encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam for dental restoration; (viii) Restricting the use of dental amalgam to its encapsulated form; (ix) Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land. Parties are required to[3]: • exclude or not allow dental amalgam, by taking measures as appropriate, the use of mercury in bulk form by dental practitioners; and • exclude or not allow dental amalgam, by taking measures as appropriate, or recommend against the use of dental amalgam for the dental treatment of deciduous teeth, of patients under 15 years, and of pregnant and breastfeeding women, except when considered necessary by the dental practitioner based on the needs of the patient.		*available and popular on the global and local markets.*

1.5 Project Background

The Africa, Caribbean, and the Pacific (ACP) Multilateral Environmental Agreements (MEAs) programme is a partnership amongst the European Union (EU), United Nations Environment Programme (UNEP), Food and Agricultural Organisation of the United Nations (FAO), and the Organisation of African, Caribbean and Pacific States (OACPs). Under this programme, funding was made available to the European Environmental Bureau (EEB) to support ACP countries in the implementation of the Minamata Convention on Mercury.

The EEB is Europe's largest network of environmental citizens' organisations that advocates for environmental justice and sustainable development. For the implementation of mercury measures, the EEB has partnered with the Zero Mercury Working Group (ZMWG). ZMWG is an international coalition of more than 110 public interest environmental and health non-governmental organizations from over 55 countries from around the world formed in 2005 by the European Environmental Bureau and the Mercury Policy Project. ZMWG strives for zero supply, demand, and emissions of mercury from all anthropogenic sources, with the goal of reducing mercury in the global environment to a minimum. It further supports the implementation of the Minamata Convention on Mercury.

As part of the EEB/ZMWG's activities, the project was developed in collaboration with the SKNBS. This national project aims to develop strategies to reduce the use and releases of elemental mercury and those MAPs listed in Article 4 of the Minamata Convention in the context of the ACP MEAs programme. Where determined feasible and there is receptivity, this will entail assisting in the development of the following components:

1. Roadmap for phasing out MAPs;
2. Market study of mercury-free alternatives;
3. Assessing/focusing institutional capacity;
4. Mercury-free product procurement;
5. Single stream product management pilot projects; and
6. National Implementation Plan.

The focus of this report is on Component 2 as listed above which involves a market study to determine the availability, accessibility, efficacy, and technical feasibility of replacing MAPs with alternatives that comply with the Minamata Convention on Mercury. An in-depth analysis of the economic feasibility of replacing MAPs with Convention-compliant alternatives was not conducted under this report as the alternatives are already common-place on the global market and are generally considered relatively affordable. The economic feasibility of mercury-free products is also made more evident when the cost of ensuring environmentally sound

disposal of MAPs is considered. A summary of cost comparisons of certain MAPs versus their Convention-compliant alternatives is included in Annex 1 for reference.

Due to the availability of data and resources for the market study, the products targeted include:

1. Lighting Devices
2. Switches, Relays and Thermostats
3. Medical Measuring Devices (Thermometers and Blood Pressure Gauges)
4. Dental Fillings

Details on how these products were selected for assessment are provided in Chapter 2 of this report.

Chapter 2: Brief Situational Analysis

2.1 Country Background

The Federation of Saint Kitts and Nevis consists of two islands, Saint Christopher (Saint Kitts) and Nevis located in the Leeward Islands of the Caribbean. With a total surface area of approximately 269 square kilometres and a population of approximately 47,606 (according to The World Bank Group, 2023), Saint Kitts and Nevis is the smallest independent country in the Americas. The capital of Basseterre is located on Saint Kitts with the primary urban area of Nevis being Charlestown.

Saint Kitts and Nevis is a democratic, sovereign and federal state and member of the Caribbean Community (CARICOM) and the Organisation of Eastern Caribbean States (OECS). The political system is based on the British system which consists of a constitutional monarchy with the Governor General representing the Titular Head of State, King Charles III. The Governor General acts on the advice of the Prime Minister under the authority of the democratically appointed Cabinet of Ministers.

Economically, services such as tourism and financial services like foreign direct investments including the "Citizenship-by-investment" programme, are the main contributors (approximately 75% in 2021) to Gross Domestic Product (GDP) in Saint Kitts and Nevis. Other sectors include construction real-estate, renting and business activities, construction, transportation, and communications. A small manufacturing sector has also been established in Saint Kitts and Nevis which contributed to approximately 4.7% of GDP in 2021 (World Trade Organisation, 2023). The manufacturing industry consists of light manufactures such as beverages and the assembly of electrical or electronic components and traps for the cable industry, mainly for export to the United States of America (World Trade Organisation, 2023).

2.2 Analysis of the National Legislative and Institutional Framework Related to MAPs

This section includes a rapid analysis of the national regulatory framework currently in place for implementing Article 4 of the Minamata Convention related to managing the trade of Convention- compliant products. A listing of the relevant legislation and institutions analysed is provided in Table 3.

In Saint Kitts and Nevis, although a small manufacturing industry does exist for the assembly of electrical and electrical components, it does not appear to be relevant to the manufacture

and export of any MAPs. This brief analysis will therefore be focused primarily on the regulatory aspects related to the import of MAPs.

Table 3: Key Policy/Legislation and Institutions Relevant to Managing Trade and Use of Minamata Convention-compliant Consumer Products

Policy/ Legislation	**Relevance**
Customs Act, Chapter 20.04 Revised Edition Of 2017	Provides a comprehensive legal framework for Customs management in Saint Kitts and Nevis.
Pesticides and Toxic Chemicals Control Act, Chapter 9.18, Revised Edition of 2009	Provides for regulation and control of importation, storage, manufacture, sale, transportation, disposal and use of pesticides and toxic chemicals
National Bureau of Standards Act, Chapter 23.15, Revised Edition of 2021.	Makes provisions for the preparation, promotion and control of standards in relation to commodities, services and practices establishes a National Bureau of Standards
Institution	**Relevance**
Saint Kitts & Nevis Bureau of Standards (SKNBS)	• Has the responsibility of protecting the environment, health and safety of consumers; • Focal point of the Minamata Convention; • Policy formulation; • Implementation oversight; • Where necessary, preparation and drafting of instructions or, in appropriate cases, working with agencies that have to prepare new legislation.
Saint Kitts and Nevis Customs and Excise Department	Government agency responsible for the country from potential risks arising from international trade and travel the legitimate movement of people and goods across the border. Control over the import of all goods into the Federation (including mercury and mercury compounds).
Ministry of Health	• Assisting in the phase-out of MAPs used in the sector such as: o Dental amalgam; o Manometers and gauges, etc.
Department of Environment	Responsibly for initiating, overseeing, co-ordinating, integrating, regulating, facilitating and monitoring environmental protection and conservation strategies and measures.
Saint Kitts and Nevis Medical and Dental Association	Network of national personnel in the medical and dental sector aiming to promote the overall physical and mental health of citizens.
Pesticides and Toxic Chemicals Control Board	Authorises the importation, storage, manufacture, sale, transportation, disposal, and use of pesticides and toxic chemicals in Saint Kitts and Nevis.
The Saint Kitts Electricity Company Limited (SKELEC)	Public utility that provides electric power generation, as well as transmission and distribution services to Saint Kitts.
The Nevis Electricity Company Limited (NEVLEC)	Fully owned subsidiary of the Nevis Island Administration that is the sole provider of electricity on the island of Nevis.

Saint Kitts and Nevis Chamber of Industry and Commerce (SKNCIC)	Private sector organization aiming to foster sustainable economic growth and a healthy environment in the business community including small, medium and large business enterprise.

Under the Customs Act, Chapter 20.04, authority is given to customs officers of the Saint Kitts and Nevis Customs and Excise Department for the examination and control of imports/exports of products. Prohibited and restricted imports/exports of goods are outlined in Part XI and the related Fourth Schedule of the act. Restrictions on the import of MAPs as prohibited goods are not currently included but as outlined in Part XI, 103(2), the relevant Minister, “may, by Regulations, amend Part 1 or 2 of the Fourth Schedule”. It is noted that while Saint Kitts and Nevis does not currently appear to import mercury and mercury compounds, their restrictions would fall under the Pesticides and Toxic Chemicals Control Act, Chapter 9.18 and its respected Schedules II and III related to the prohibition of imports and exports of chemicals with the Pesticides and Toxic Chemicals Control Board being responsible for regulating imports.

As noted by Thompson (2020), the process that was taken in Saint Kitts and Nevis to amend regulations to include ozone depleting substances covered under the Montreal Protocol, can be adapted for the restriction of other hazardous chemicals and products such as MAPs.

Through the work being conducted by the Secretariat of the Minamata Convention on Mercury and the UNEP Global Mercury Partnership’s Mercury in Products partnership area, and in consultation with other stakeholders, a draft guidance document has been developed to support countries in the development of new HS Codes to further distinguish between MAPs and their mercury-free alternative products through the development of eight- or ten-digit HS codes.

Another aspect related to phasing out of MAPs, relates to regulations for the proper labelling of products being imported and sold on the market. While the inspection and clearing of goods is noted under the Customs Act, Chapter 20.04 and the labelling of commodities is mandated by the SKNBS under the National Bureau of Standards Act, Chapter 23.15, identification of mercury in MAPs may require further incorporation. Through the work being conducted by the Secretariat of the Minamata Convention on Mercury and the UNEP Global Mercury Partnership’s Mercury in Products partnership area, and in consultation with other stakeholders, a draft guidance document has been developed to support countries in the development of new Harmonised System (HS) Codes to further distinguish between MAPs and their mercury-free alternative products through the development of eight- or ten-digit HS codes which can be referenced.

Training of the customs officers should be conducted to ensure their awareness of the need for monitoring product labelling and assessing Safety Data Sheets to identify mercury-free alternative products (Thompson, 2020). Personnel should also be equipped with and trained in the use of tools to aid in the identification of mercury in products being imported such as handheld XRF (X-ray fluorescence) Analysers (BCRC-Caribbean, 2018). All training activities conducted should also include or result in the development of Standard Operating Procedures that can be referenced as needed by relevant personnel (Thompson, 2020).

To ensure the effective phase out of MAPs and promotion of alternative products on the market, coordination amongst all relevant public and private sector bodies is essential. The promotion of mercury-free medical measuring devices and mercury-free dental fillings in the public and private health care sectors should be coordinated by the SKNBS in collaboration with the Department of Environment, Ministry of Health and the Saint Kitts and Nevis Medical and Dental Association. It has been noted that under the related National Action Plan for mercury management that is currently under development, green procurement policies have been drafted for adoption by the national government.

Coordination with SKELEC and NEVLEC to ensure the continued promotion and prioritization of mercury-free and energy efficient lighting is also needed.

The SKNCIC functions to represent the business community, including the import, export and manufacturing sectors. Coordination and awareness raising between the Government and SKNCIC to ensure all business and manufacturing enterprises are aware of, and engaged in the promotion of mercury-free alternative products is a key aspect to ensure the effective implementation of Article 4 of the Minamata Convention.

2.3 Status of Mercury-Added Products in Saint Kitts and Nevis

2.3.1. Minamata Initial Assessment Findings

From 2016 – 2019, a sub-regional project, “Development of Minamata Initial Assessment in the Caribbean- Jamaica, Saint Kitts and Nevis, Saint Lucia and Trinidad and Tobago” (MIA Project) was conducted that was funded by the Global Environment Facility (GEF), implemented by UNEP, and executed by the Basel Convention Regional Centre-Caribbean (BCRC-Caribbean), with the SKNBS acting as the National Executing Body.

Through this project, a national inventory of sources of mercury releases was conducted based mainly on 2015 quantitative data and assumptions made. It was found that the majority of mercury releases were attributed to the use and disposal of consumer products with intentional use of mercury (approximately 26 kg/year), and a further 5 kg/year was found to

be due to the use and disposal of medical blood pressure gauges and the preparation, use and disposal of dental amalgam (assessed under the source category: “Other intentional product/process use”) (BCRC-Caribbean, 2018).

Figure 1 shows the MAP sub-categories identified as responsible for mercury releases in Saint Kitts and Nevis based on 2015 data and assumptions. The sum of mercury releases from all MAPs quantified was used to determine the percentage distribution of mercury releases for each MAP sub-category.

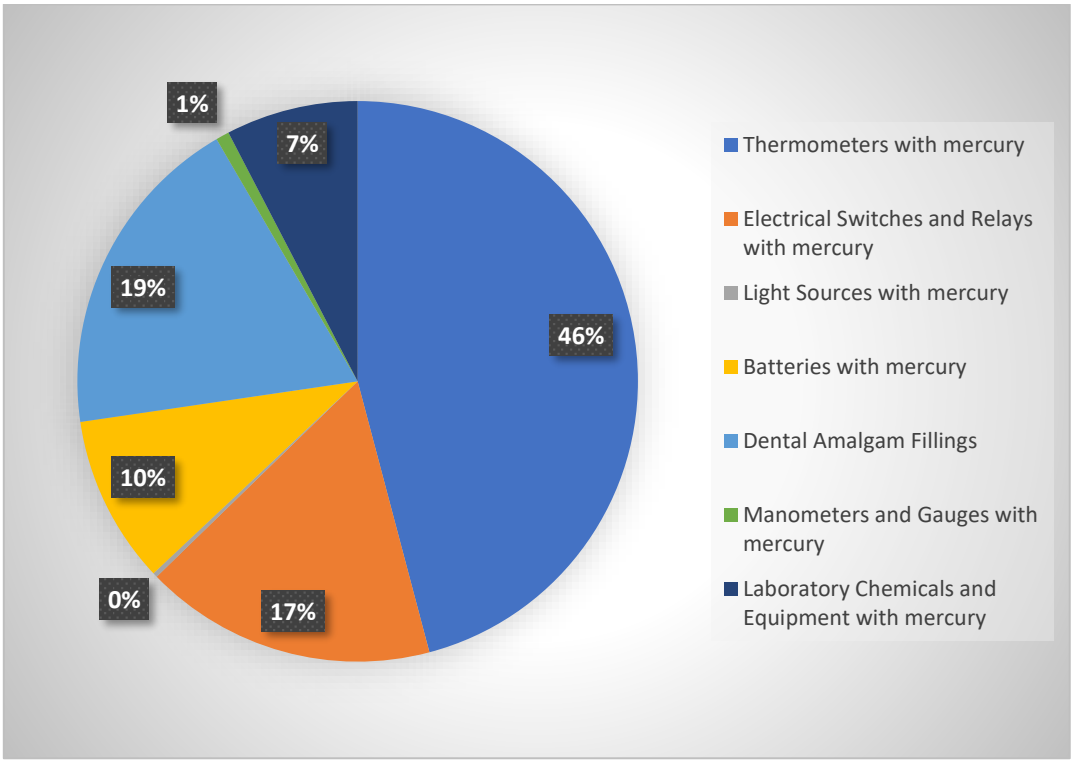

Figure 1: Estimated Percentage Distribution of Mercury Releases within the MAP Categories Identified in the Inventory of Mercury Releases in the MIA Project (created using data from BCRC-Caribbean, 2018. NOTE: See Footnote 3)

Lighting Devices with mercury

Assumptions made on Customs and Excise import data were undertaken to estimate the import of mercury-added light sources such as, CFLs, LFLs, High Intensity Discharge Lamps (HIDLs). It was noted that mercury-free Light Emitting Diodes (LEDs) had become increasingly popular in commercial and residential areas, and a venture to install solar-powered LED streetlighting replacements had been initiated since 2013 (BCRC-Caribbean, 2018). These

[3] Estimated mercury releases for these products, were made based on various uncertainties and assumptions which may have led to over-estimations.

factors may have attributed to the estimated mercury releases from these products being considered negligible at the time.

Electrical Switches and Relays with mercury

Electrical switches and relays with mercury were assumed to cause the second largest amount of mercury releases for the MAPs identified.[4] Mercury is used in some switches and relays, generally found in various electronic equipment due to its high density, conductivity and sensitivity to temperature (UNEP, 2019b). Mercury content can range widely across these products with some being recorded as having 0.001 grams of mercury per item and others having up to 400 grams of mercury per item depending on type (UNEP, 2019b). Since these products are typically found as components of larger products, determining quantities that are in use in a country and their mercury content is extremely difficult which resulted in default calculations being used for the 2015 inventory.

Lab Chemicals and Equipment with mercury

For this category, the potential presence of mercury in laboratories and the import of mercury-added thermostats were identified for assessment. The use of mercury containing lab chemicals and equipment could not be determined and as such default formulae based on population data and electrification rates were used to estimate releases. It was noted that in 2015, 431 thermostats that were assumed to contain mercury were imported. **Mercury-added thermostats** may contain more than one mercury switch resulting in even higher mercury content per item (IMERC, 2018). This was noted for further assessment.

Manometers and Gauges with mercury

Manometers and gauges were assumed to account for only approximately 1% of the mercury releases due to MAPs based on default calculations available in the UNEP Toolkit used to make estimations for the inventory. Based on questionnaire responses from healthcare personnel at the time of the MIA Report development, the use of mercury-added blood pressure gauges was gradually decreasing as there was more awareness of mercury pollution and increased availability in mercury-free digital blood pressure gauges.

Thermometers with mercury

For the national inventory on mercury-added thermometers in Saint Kitts and Nevis, import data from 2015 for medical thermometers, ambient air temperature thermometers and industrial and special application thermometers was used to estimate the potential mercury releases from these products. While the overall thermometers category was estimated to

contribute to the highest mercury releases from MAPs for Saint Kitts and Nevis, it was noted that this was based on several assumptions regarding mercury content. Medical thermometers only accounted for an estimated 0.04 kg/year of mercury releases (0.26% of the total releases from thermometers).

Dental Amalgam Fillings

For the assessment on dental amalgam under the MIA Project, quantities of dental amalgam imported or used were not able to be captured as dentists contacted did not maintain detailed logs of dental amalgam use and Customs and Excise data did not have any clear indication of these products. Instead, the national inventory of mercury releases from dental amalgam estimate used default formulae that used the number of dentists per 1,000 inhabitants estimated to be 0.2) as well as the number of inhabitants (BCRC-Caribbean, 2018). The releases estimated considered mercury inputs during the preparation, use and disposal of amalgam. Dental sector stakeholders engaged for the inventory indicated that, similarly to worldwide trends, dental amalgam was no longer a popular dental restoration material and instead mercury-free, teeth-coloured composite fillings have become the preference due to availability and aesthetics (BCRC-Caribbean, 2018).

Batteries with mercury

While mercury-added batteries were determined to be the fourth largest source of mercury releases from MAPs according to the 2015 inventory data, 2019 global market data on mercury-added batteries found that many well-known global battery suppliers such as, Duracell, Energizer, Varta and Panasonic only supply mercury-free batteries. Furthermore, as of January 2021, China prohibited the manufacturing and import of mercury-added batteries except for the types still allowed under the Minamata Convention (UNEP, 2019b).

2.3.2 MAPs Identified for Consideration Under the Market Study

Due to the availability of data and resources for the market study, four main products were targeted for assessment. Based on the results of the previous national inventory of mercury releases, the following products were identified for review under this study:

- Lighting Devices
- Switches, Relays and Thermostats
- Medical Measuring Devices (Thermometers and Blood Pressure Gauges)
- Dental Fillings

Due to the recent global market assessment on batteries noted previously, most batteries are largely assumed to be mercury-free. As such, batteries were not considered as key products of focus under this market study.

Mercury-added cosmetics have been identified as a potential area of concern across the Caribbean but have not been included under this study as more in-depth assessments are expected to be conducted under ongoing global and regional projects.

Chapter 3 – Methodology

3.1 Background and Desktop Research

Information for the assessment was gathered from meetings and interviews held with staff at the SKNBS. During these meeting the key stakeholders were identified to participate in the questionnaires. In addition to these meeting, studies relating to mercury products were reviewed to gather information for the research.

Market study challenges and mitigation measures can be found in Annex 3.

3.2 Market Survey- Stakeholder Engagement

To assess the status of mercury products in Saint Kitts & Nevis, survey questionnaires were designed to capture key data from relevant stakeholders. Prior assessments of the mercury products usage help to determine the appropriate the appropriate entities to target to gather data to assess their status to phase out mercury products.

Once the organizations were identified, the survey questionnaires were emailed to key persons in their organization for completion. The survey questionnaires were either completed electronically via email correspondence or in person interviews. The survey questionnaires used, aimed to be participatory and sought to actively engage relevant stakeholders in order to capture local knowledge, practices and data as relates to the use mercury products. The questionnaires were also Target stakeholders included dentist, medical associations (private and public), hardware stores, relevant government departments and users of light.

Each questionnaire developed is provided in Annex 4 of this report.

Lighting Devices

Two (2) Hardware Stores and Home and Building Centres were surveyed for the Lighting Devices as they are retailers who import and sell lighting devices in Saint Kitts & Nevis. The questionnaires were completed electronically and via in person interview.

The public works department and main electricity company in Saint Kitts were surveyed to assess the lighting devices imported to replace bulbs in government offices and public streetlights. The surveys were completed via in person interview.

Switches, Relays and Thermostats

Three (3) hardware stores were contacted to provide information on the import and sale of switches, relays and thermostats. All 3 provided responses. The main supplier of electricity in Saint Kitts also provided information on the type of switches, relays and thermostats used.

Medical Measuring Devices

The main medical hospital inventory department in Saint Kitts & Nevis was contacted as they are responsible for the procurement of the majority of medical supplies for hospitals and public medical centres in Saint Kitts & Nevis.

Five (5) medical associations were targeted to provide information on medical devices, of which two (2) participated in the surveys due to availability.

Additionally, three (3) pharmacies were engaged for information on the retail of thermometers and blood pressure machines. All 3 provided survey responses.

Dental Fillings

Twelve (12) dentists (public and private) were identified for the surveys, of which eight (8) responded.

Summary

Identification codes were assigned to stakeholders from which data was obtained for the assessment (as shown in Table 4) to maintain confidentiality.

Table 4: Identification Labelling Codes Assigned to Market Survey Stakeholders.

Sector	**Market Survey Respondents' Identification Codes**
Lighting Devices Importers/Retailers	LDI1, LDI2, LDI3
Lighting Devices Users	LDU1, LDU2,
Electrical Switches, Relays and Thermometers	ESRT1
Medical Measuring Devices	MMD1, MMD2, MMD3, MMD4, MMD5, MMD6, MMD7
Dental Fillings	D1, D2, D3, D4, D5,

Chapter 4: Findings and Analysis

4.1 Product Assessments

4.1.1 Lighting Devices

In assessing lighting devices, feedback was sought from both users and retailers/suppliers of the products. It should be noted that data to compare the availability of mercury-added Linear Fluorescent Lamps (LFLs) and High Intensity Discharge Lamps (HIDLs) versus their mercury-free alternatives was not provided during the data collection process. It was therefore assumed for this study that the results of the assessment applied to all mercury-added lighting varieties and their LED alternatives.

The one (1) respondent to the Light Devices User survey represented a large commercial complex in Saint Kitts (referred to as LDU1) and indicated that all of their buildings/operations use solely mercury-free lighting devices.

All respondents to the Lighting Devices Retailers/Suppliers survey stated that they currently import both mercury-added and mercury-free lighting devices. Statements from the national consultant under this project also noted that both mercury-added and mercury-free lighting devices are available across retail stores in the country. Quantitative data was only received from LDI1 which represented a retail store located in Saint Kitts. Data indicated that over the period 2019 – 2021, 774 compact fluorescent lamps (CFLs) were sold in comparison to 233 of the CFL-replacing LEDs (Light Emitting Diodes). Despite this, LDI1 indicated that, as a retailer, mercury-free lighting devices were preferred in terms of all essential criteria such as affordability, availability and energy efficiency among other factors. LDI1 also stated that no challenges were foreseen for the phase-out of mercury-added products but noted that engaging the private sector and providing sales staff with the necessary technical information to assist consumers in making more environmentally sound choices was recommended for the effective promotion of mercury-free products.

While no quantitative data was provided by LDI2, a large-scale distributor and retailer of lighting devices in Saint Kitts and Nevis, feedback indicated that customers typically preferred mercury-free lighting devices such as LEDs.

LDI3 represented the public sector, and it was indicated through follow-up discussions that in addition to importing lighting devices for their own facilities, they provide recommendations to companies on the procurement of lighting devices and may assist in installations. LDI3 indicated that while mercury-free lighting devices were preferred in terms of energy efficiency and shelf-life, one of the challenges identified in obtaining mercury-free lighting devices

included delays in processing orders from manufacturers/traders. This challenge was also noted by LDU1 who detailed that especially due to the onset of the Covid-19 pandemic, products were difficult to source and delays were experienced. As the popularity and accessibility of mercury-free lighting devices such as LEDs continues to increase on the global market, these challenges are expected to be alleviated.

All respondents (users and retailers/suppliers) stated that no major challenges were foreseen for the implementation of phase-out measures for mercury added products in Saint Kitts and Nevis, though all indicated that more should be done by the Government of St Kitts and Nevis to implement measures for the promotion of mercury-free lighting (such as LED bulbs). The promotion of awareness raising campaigns amongst the general public (consumers) in coordination with the retail sector was recommended.

In terms of public utility lighting devices, the Ministries of Sustainable Development; Finance; Public Infrastructure, and Sports in collaboration with the Saint Kitts Electricity Company (SKELEC) and Nevis Electricity Company (NEVLEC), are in the process of implementing the 'Street and Flood Light Retrofitting Project' which is financed by a loan through the Caribbean Development Bank (CDB). Under the project, streetlights across the country were retrofitted with mercury-free LEDs between 2020 – 2021 and the installation of LED floodlights in sporting facilities was expected in 2022.

4.1.2 Electrical Switches, Relays (and Thermostats)

Obtaining quantitative data to inform the market study of mercury-added versus mercury-free electrical switches, relays and thermostats in the electrical and lighting sector was unsuccessful under this study. There was a general uncertainty of the presence of mercury in electrical switches, relays and thermostats ordered and sold on the island. Of the four (4) respondents to the survey, ESRT1 represented the main electricity service provider for the island of Saint Kitts. While information on the electrical switches, relays and thermostats could not be provided via the questionnaires addressed to the relevant suppliers, it is noted that ESRT1 is committed to environmentally sound practices in its company's mandate, as it is transitioning to renewable energy sources. The remaining three (3) respondents (Identifying Codes: ESRT2, ESRT3 and ESRT4 respectively) represented national retailers. ESRT2 indicated that both mercury-added and mercury-free electrical switches and relays were in stock with both varieties being imported mainly from China and Taiwan. ESRT3 indicated that only mercury-free electrical switches and relays were in stock while both varieties of thermostats (mercury-added and mercury-free) were in stock. Both ESRT3 and ESRT4 indicated that they imported products mainly from the USA and the United Kingdom.

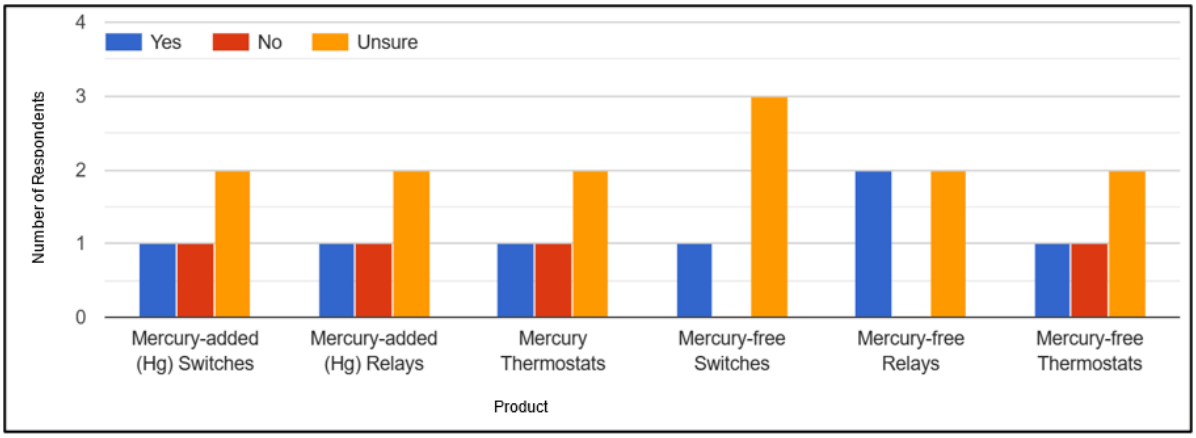

Figure 2: Summary of Survey Responses on the Types of Products in Stock

Global trends indicate that mercury-free switches, relays and thermostats have become more popular over the past twenty (20) years (UNEP, 2019b). Studies conducted in the United States of America (USA) indicate that as of 2016, all known thermostat manufacturers in the USA have phased out the production and sales of mercury thermostats in favour of mercury-free alternatives (IMERC, 2018). Based on 2014 data, over twenty (20) well-known USA-based manufacturers of electrical switches and relays also phased out the production and sales of various types of mercury switches and relays (IMERC, 2014). One (1) such USA-based manufacturing brand, GE Appliances was identified as a brand sold in Saint Kitts and Nevis. However, 2019 research indicated that certain types of mercury-added electrical switches and relays were still available from other suppliers such as Newark Element 14, Gordo Sales Inc., Comus International (all based in North America) as well as several suppliers based in India (UNEP, 2019b).

Table 5 below summarises the types of mercury-free electrical switches, relays and thermostats that have become readily available on the global market in comparison to their MAP counterparts (IMERC, 2014; IMERC, 2018).

Table 5: Alternatives to Mercury-Added Electrical Switches, Relays and Thermostats (IMERC, 2014; IMERC, 2018)

Potentially Mercury-added Component or Product	**Mercury-free Alternative(s)**
Float switch	Mechanical, magnetic dry reed, optical, conductivity, metallic ball, sonic or ultrasonic, pressure transmitter, alloy, thermal, and capacitance float switches
Tilt switch	Metallic ball, electrolytic, mechanical, solid-state, and capacitance tilt switches; potentiometers
Pressure switch	Mechanical or solid-state switches

Temperature switch	
Mercury displacement relay	Dry magnetic reed, electro-mechanical, and solid-state relays; silicon-controlled rectifiers
Mercury wetted reed relay	
Mercury contact relay	
Flame sensor	Electronic ignition systems
Mercury thermostat	Electromechanical Thermostats (e.g. reed switch, snap-switch etc.); Digital Thermostat (electronic programmable)

The majority of survey respondents indicated that more education and awareness raising efforts were needed for both retailers and consumers on the presence and effects of mercury in products in order to encourage the phase out of these products.

4.1.3 Medical Measuring Devices – Thermometers and Blood Pressure Gauges

Six (6) stakeholders responded to the questionnaire for medical measuring devices representing retail pharmacies as well as private and public medical associations in Saint Kitts and Nevis. Five (5) respondents indicated that both mercury-free thermometers and blood pressure gauges were the sole types of products in use in their facilities or retailed. However, the sixth respondent (referred to as MMD1), a medical product supplier for the public hospital and public medical centres on the island of Saint Kitts, indicated that approximately 1,500 units of mercury thermometers were imported between 2019 – 2020 from a retail company based in New York, USA. MMD1 noted that mercury sphygmomanometers had been imported previously but not in the past three (3) years. MMD1 also stated that mercury-free thermometers and blood pressure gauges were imported though specific import figures were not available. A representative of the public medical sector on the island of Nevis was contacted for further verification and provided feedback indicating that mercury-added medical devices had not been imported for over fifteen (15) years for use in Nevis' public health sector.

All six (6) respondents stated that no major challenges were foreseen for the implementation of the phase-out of the import of mercury-added medical devices. It is important to note that in order to promote the use of mercury-free alternatives further, as per their technical efficiency, it needs to be ensured that healthcare professionals are regularly trained and that standardized methodologies are utilised to measure temperature and blood pressure (WHO, 2020).

4.1.4 Dental Restoration Materials

Eight (8) dentists provided feedback via the Dental Filling questionnaire that was distributed under the market study with levels of professional dental experience ranging from less than

five (5) years to over twenty (20) years. Most respondents indicated that they operate in private clinics/hospitals.

The majority of dentist respondents (6) no longer use dental amalgam in their dental restoration operations, nor do they have dental amalgam in stock. The two (2) dentists (identifying codes: D1 and D2) that still use dental amalgam utilise it in its pre-capsulated form (single-dental restoration capsules of pre-dosed amalgam). D1 indicated that it was used in less than 10% of dental restoration procedures in the last three (3) years while D2 stated that it was utilised regularly in approximately 70% of dental restoration procedures, though the latter's frequency of use may have been due to biomedical research purposes.

Some responses indicated that dental amalgam fillings may be preferred in instances when controlling oral fluids (moisture control) is difficult, for teeth that are difficult to access (such as third molars) or for its durability. In preparation for the Minamata Convention on Mercury's COP-4 held in 2021-2022, a number of Parties to the Convention and related stakeholders provided feedback on the technical efficacy of mercury-free fillings and concluded that mercury-free composite fillings exhibit satisfactory mechanical properties, require less preparation for use and provide better aesthetics since they are tooth-coloured. Emphasis is also placed on the provision of up-to-date dental training to ensure that dental practitioners are able to effectively use mercury-free fillings in various scenarios including where moisture control is difficult, or teeth are difficult to access.

Figure 3 illustrates that for other factors identified in the questionnaire, most dentists agree that mercury-free fillings are preferred when assessing safety for use by patients, effectiveness and ease of disposal. In terms of availability on the market and from suppliers, mercury-free filling materials are also preferred.

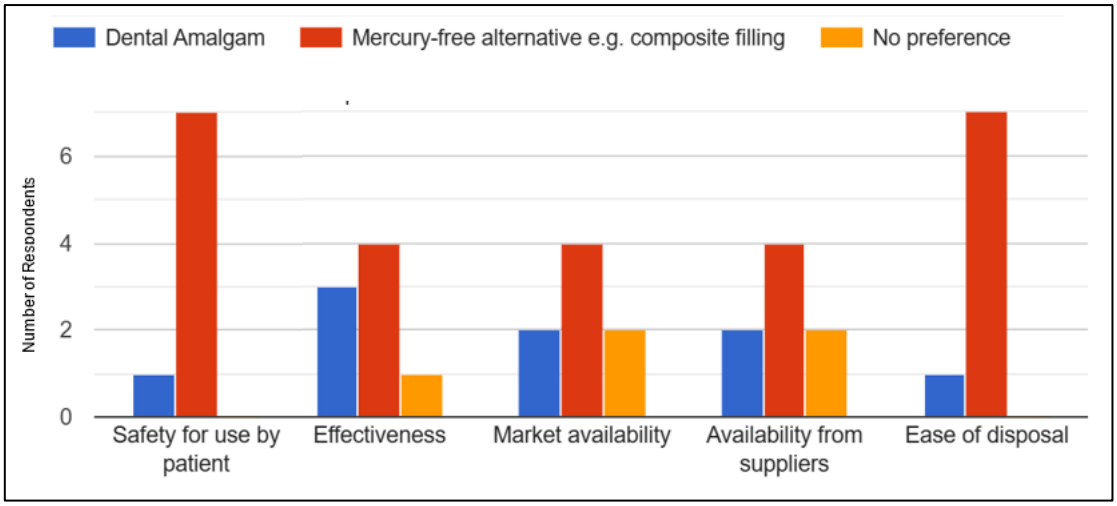

Figure 3: Survey Respondents' Preference of Dental Amalgam Versus Mercury-free Alternatives based on Various Factors

Most dentist respondents indicated that they were aware of the environmental and health impacts of mercury and that dental amalgam was being phased down globally. Dental amalgam use is strongly discouraged for vulnerable population groups including children due to the potential health effects associated with mercury exposure on developing bodies. As of 2022, Part II of Annex A of the Minamata Convention on Mercury that refers to dental amalgam has been updated to include that Parties, "shall exclude or not allow, by taking measures as appropriate, or recommend against the use of dental amalgam for the dental treatment of deciduous teeth, of patients under 15 years, and of pregnant and breastfeeding women, except when considered necessary by the dental practitioner based on the needs of the patient".

When asked their opinions on the potential barriers to phasing out dental amalgam in the national dental sector, the majority saw no major challenges, but the need to sensitize the general public on the issues associated with mercury and dental amalgam was highlighted.

Chapter 5: Conclusions and Recommendations

Globally, there are currently 140 Parties to the Minamata Convention on Mercury, including Saint Kitts and Nevis, that have agreed (among other obligations) to phase out the manufacture, import and export of MAPs listed under the Convention and phase down the use of dental amalgam. Many of these countries have already phased out[11] these products according to the Convention's 2020 deadline with few countries, such as India and China, requesting exemptions to phase out certain MAPs within the next few years. As such, the manufacture of MAPs has declined in recent years with mercury-free alternative products becoming increasingly popular and overtaking the global market.

The findings of the national market study conducted generally reflect global trends. It was found that Minamata Convention-compliant products already dominate the market in Saint Kitts and Nevis, though further measures to effectively promote mercury-free alternatives are needed.

Key factors were assessed to determine the feasibility of replacing MAPs identified with mercury-free alternatives in Saint Kitts and Nevis[12] as detailed in Table 6 below.

Table 6: Summary Assessment of the Availability of Minamata Convention-compliant Alternative Products to MAPs

Lighting Devices	
Type of Product	LED Lighting Devices
Availability	• LEDs are available on the national market. • The Government of Saint Kitts and Nevis have embarked of funded initiatives to replace streetlighting and floodlights with mercury free LED-alternatives.
Efficacy/Reliability	• LEDs do not contain mercury and their use results in lower energy consumption which subsequently results in lower carbon emissions (in comparison to mercury-added or other types of light bulbs). LEDs demonstrate higher brightness (lumens) and have a longer functional lifespan than mercury-added lighting products.
Overall Feasibility of Replacing MAPs with Mercury-free Alternatives	• The growing popularity of LEDs lighting devices over the past three (3) to five (5) years indicates a gradual phase-out of mercury-added lighting devices for Mercury Convention-compliant lighting products. • LED lighting is also proven to be more energy efficient which further promotes MAP phase out under various energy efficient/green policies being promoted by the Government. • Research has indicated that when factors such as wattage, brightness, energy efficiency and lifespan are assessed, LED alternatives are approximately 50% more economically viable. Public awareness strategies should be conducted to educate suppliers and consumers of the environmental and health benefits of phasing out MAPs as well as the cost

	savings to further promote the use of LEDs, especially for LEDs replacing LFLs. • While data on LFLs and HIDLs were not captured under this assessment, LED-replacing HIDLs have a higher efficacy than other types of HIDLs including High Pressure Sodium Lamps or Metal Halide Lamps. While the latter types are expected to be compliant with the Minamata Convention and are still generally more popular that their LED alternatives, LEDs are recommended for use in this lighting category where feasible. • Current Customs HS Codes already distinguish between LED lighting devices and non-LED lighting devices however, amending the Custom Codes to distinguish amongst the types of LED lighting devices will enhance identification of their trade.
Electrical Switches, Relays and Thermostats	
Type of Product	Mercury-free switches; mercury-free relays; electromechanical or digital thermostats
Availability	No local data could be found to confirm availability as typically, import data does not currently differentiate between mercury-added and mercury-free varieties and feedback from stakeholders was inconclusive (since these products are often components within larger products), but global trends indicate that mercury-free alternatives have become widely available over the past two (2) decades.
Efficacy/Reliability	While the specific suitability of switches, relays and thermostats vary across multiple potential applications, research indicates that mercury-free switches, relays and thermostats are globally available, reliable and adequate for a variety of functions.
Overall Feasibility of Replacing MAPs with Mercury-free Alternatives	• In terms of the practical use, mercury-free alternative electrical switches, relays and thermostats appear to be widely available and highly reliable for their variety of applications. • While mercury-free alternatives have become the main type on the global market over the past twenty (20) years, there may still be some MAPs entering the Saint Kitts and Nevis market. Identifying which of these products contain mercury has proven to be a challenge. • While recommendations for addressing these MAPs under HS Codes and labelling standards can be made nationally as well as the promotion of public awareness, there is global consensus on overall feasibility of replacing these MAPs with mercury-free alternatives.
Medical Measuring Devices – Thermometers	
Type of Product	Mercury-free thermometers may include alcohol or infrared types, but for clinical use, digital thermometers are the most well-known.
Availability	Mercury-free thermometers are the main types of thermometers in use across all relevant sectors and appear to be predominantly available on the global and local market in both the public and private sectors.
Efficacy/Reliability	Extensive research by the WHO and other recognised bodies have concluded that digital thermometers have a high efficacy (in comparison to mercury-added thermometers and other types).
Overall Feasibility of Replacing MAPs with Mercury-free Alternatives	Mercury-added thermometers have been largely phased out in the public and private medical sector and in retail. Public awareness and ensuring regular training of healthcare students and professionals in the use of mercury-free digital thermometers should be incorporated into the health sector and via public communications.
Medical Measuring Devices – Blood Pressure Gauges	
Type of Product	Aneroid sphygmomanometers and several types of automated (electronic) blood pressure gauges. (Note: some types may contain small concentrations of mercury. Currently, these are not restricted under the Minamata Convention).

Availability	• Minamata Convention-compliant blood pressure measuring devices are the predominant types available on the global and local market. • Globally, the manufacture of these MAPs has reduced due to the increased preference for mercury-free and technologically advanced varieties and phase-out efforts of Parties under the Minamata Convention on Mercury.
Efficacy/Reliability	Research by the WHO concluded that mercury-free validated automatic blood pressure machines produce more accurate and consistent measurements (in comparison to mercury-added measuring devices).
Overall Feasibility of Replacing MAPs with Mercury-free Alternatives	• Mercury-added sphygmomanometers have been largely phased out in the public and private medical sector. • Public awareness and ensuring regular training of healthcare students and professionals in the use of Minamata Convention-compliant blood pressure measuring devices should be incorporated into the health sector and via public communications.
Dental Restoration Materials (Fillings)	
Type of Product	Composite (resin) fillings
Availability	• Composite fillings for dental restoration have become the predominant preference on the global and local market for many years.
Efficacy/Reliability	• Global assessments on technical efficacy of composite fillings have concluded that they exhibit satisfactory mechanical properties, require less preparation for use and preferred by patients due to aesthetics (in comparison to dental amalgam fillings). • Providing adequate training of dental practitioners in the preparation and placement of composite fillings will ensure their effectiveness and durability.
Overall Feasibility of Replacing MAPs with Mercury-free Alternatives	Under the Minamata Convention on Mercury, Parties are expected to take two (2) or more provisions to phase down its use. Measures outlined in Annex A Part II of the Convention that should be implemented nationally include: • Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration; • Encouraging representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices; • Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land. As of 2022, Parties shall, “exclude or not allow, by taking measures as appropriate, the use of mercury in bulk form by dental practitioners”. The dental survey showed also that the encapsulated form was the predominant type used, aligning with the above provision. As of 2022, Parties will also be expected to take appropriate measures to prevent dental amalgam use for patients under 15 years of age, and of pregnant and breastfeeding women, except when considered necessary. This can be enhanced through coordination with the Saint Kitts and Nevis Medical and Dental Association.

Recommendations for Saint Kitts and Nevis to ensure the implementation of Article 4 of the Minamata Convention on Mercury are as follows:

I. **Enhancement of the National Regulatory Framework:**

MAPs are not manufactured or exported nationally. In order to enhance the prohibition of imports of MAPs, it is recommended that the Fourth Schedule, “Prohibitions and Restrictions” of the Customs Act, Chapter 20.04 be amended to include MAPs as listed under Part 1, Annex A of the Minamata Convention on Mercury.

The adoption of Green Procurement Policies by the national government has also been noted as a priority for action under their ongoing National Action Plan for mercury management.

II. **Development of a Communication and Coordination Strategy to Promote Mercury-free Alternative Products:**

Under the MIA project conducted in Saint Kitts and Nevis, several awareness raising materials were developed to educate the public and key stakeholders in the public and private sector about the benefits of the Minamata Convention on Mercury, its obligations and the need to phase out MAPs.

Materials developed[5] included:

5. Informational National Video, “Managing Mercury in Saint Kitts and Nevis” available at: Managing Mercury in Saint Kitts and Nevis - YouTube
6. Informational Caribbean Video, “Managing Mercury in the Caribbean” available at: Managing Mercury in the Caribbean - YouTube (full version) and Managing Mercury in the Caribbean - Condensed - YouTube (condensed version).
7. Non-technical Summary Document “The State of Mercury in Saint Kitts and Nevis”
8. Awareness Posters/Infographics on various mercury-related topics such as, but not limited to:
    i. Mercury in Everyday Products (Figure 4)
    ii. Mercury and Health
    iii. Mercury in Medical and Industrial Devices

Further to this, under the regional “Development of Minamata Initial Assessments in the Caribbean” projects executed by the BCRC-Caribbean, an updated Communications Strategy and Guidance Document to enhance awareness of the Minamata Convention on Mercury was made available to the Saint Kitts and Nevis Bureau of Standards in 2020 which included further material (available at: MIA-2 Awareness Raising Material – BCRC Caribbean (bcrc-caribbean.org).

[5] Available at: MIA-1 Awareness Raising Material – BCRC Caribbean (bcrc-caribbean.org)

The use of these materials and strategies facilitated through the BCRC-Caribbean can be adapted to develop an updated awareness campaign that highlights the engagement of the public as well as, relevant businesses and key stakeholders in the medical and dental sector.

Coordination of public awareness efforts between government stakeholders and private stakeholders in the relevant manufacturing, retail and medical sectors is essential to ensure clear communication and follow-through for the phase-out of MAPs and replacement with mercury-free alternative products.

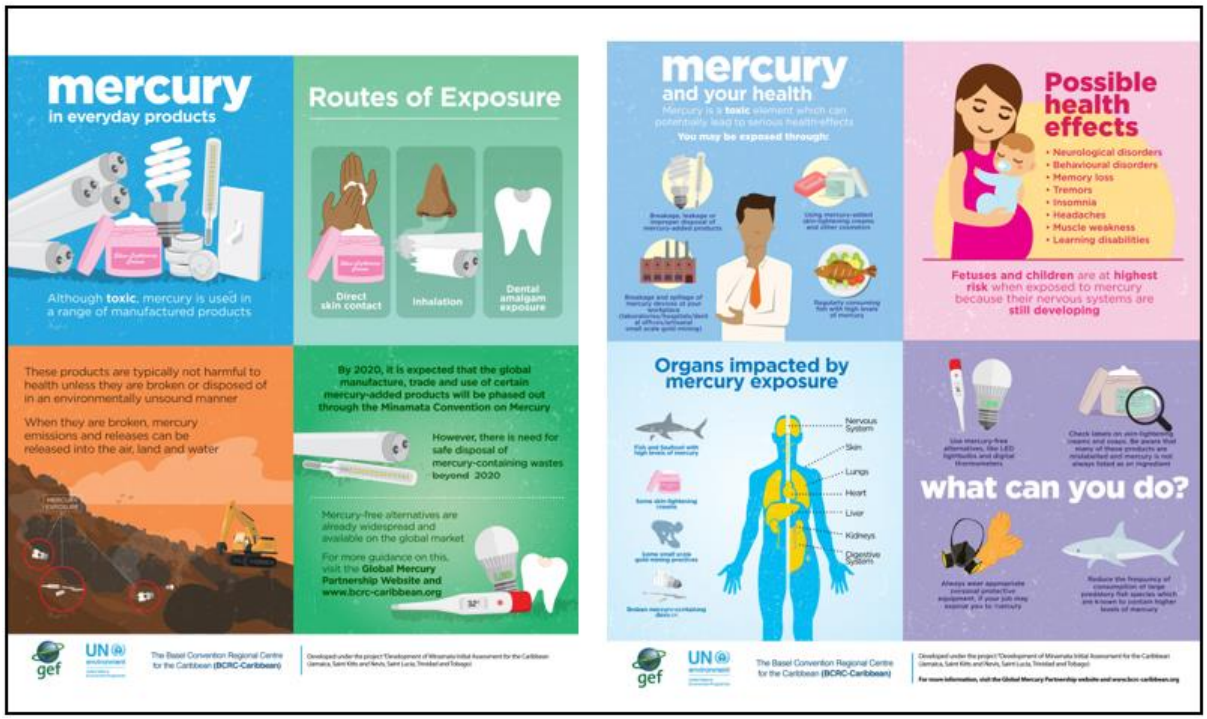

Figure 4: Images of the "Mercury in Everyday Products" and "Mercury and your Health" posters developed under the MIA Project.

III. Coordination with Related Projects and Initiatives for the Overall Protection of Human Health and the Environment:

- Saint Kitts and Nevis is also a participating country under the global programme, "GEF ISLANDS" being executed regionally by the BCRC-Caribbean. This project aims to strengthen countries' abilities to control the flow of chemicals, products and materials into their territories and to unlock resources for long term management of chemicals and wastes including integrated chemicals and wastes management in SIDS. The project will

specifically target the management of Persistent Organic Pollutants and mercury. Through this project, the enhancement of national regulatory framework and training of Customs officials as needed to prevent the import of MAPs and other targeted chemicals/products will be implemented.

- Under the project, “Technical assistance to Parties to implement Articles 3, 4, 10 and 11 of the Minamata Convention on interim storage, disposal of waste in mercury-added products using guidelines from the Minamata Convention” coordinated by the Caribbean Community (CARICOM) Secretariat, a training programme to regional/sub-regional authorities on the environmentally sound management of waste MAPs was initiated. A training manual was developed that is available for participating countries which include Saint Kitts and Nevis.

- Saint Kitts and Nevis, through the Saint Kitts and Nevis Bureau of Standards, is currently involved in the overall strengthening of the regional laboratory capacities for testing of products to identify or quantify mercury content under the Caribbean Regional Mercury Monitoring Network (CRMMN) initiative developed by the Biodiversity Research Institute (BRI) and the Department of Analytical Services in Antigua and Barbuda. Activities for the initiative are ongoing and regular updates should be provided to the Government to monitor progress.

- Sharing of the outcomes and progress of the Street Lighting Retrofitting Project, through which potentially mercury-added lighting is replaced with LED alternatives, will strengthen the guidance and communication efforts for the overall promotion of mercury-free alternative products.

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Annexes

Annex 1 – Brief Economic Analysis of Minamata Convention-compliant Products

Table A1: Economic Affordability of Minamata Convention-compliant Products in Comparison to MAPs

Economic Affordability of Minamata Convention-compliant Products in Comparison to MAPs
Lighting Devices
• LEDs replacing CFLs have a lower sale price than CFLs while LEDs replacing LFLs are still more expensive in terms of sale price than LFLs (by approximately 25% on average). Once factors such as lamp wattage, brightness and lifespan are assessed, LEDs are found to be more economically viable than the MAPs. • Due to the large variations in costs of the different types of HIDLs based on the different applications and fixtures required, cost differences were not able to be assessed. For this study, it is assumed that the economic feasibility of mercury-free LED versions of HIDLs would be similar to that of other LED lighting devices.
Electrical Switches, Relays and Thermostats
• While specific costs of switches, relays and thermostats vary across the multiple potential applications, research suggests that there is no significant difference in cost between mercury-added and mercury-free switches, relays and thermostats. • Higher costs may also be associated with the mercury-added types of these products when considerations are made for the need for environmentally sound storage and disposal. As such, mercury-free alternatives are considered generally more economically affordable.
Medical Measuring Devices – Thermometers
• Mercury thermometers have similar retail prices as basic digital thermometers. Prices of digital thermometers may vary based on several features such as temperature memory storage. • Higher costs may also be associated with the mercury thermometers when considerations are made for their need for environmentally sound storage and disposal.
Medical Measuring Devices – Blood Pressure Gauges
• Mercury sphygmomanometers are approximately half of the sale price of other automated varieties, but higher costs may also be associated with the mercury sphygmomanometers when considerations are made for their need for environmentally sound storage and disposal.

- Retail cost was also not determined to be a significant driver affecting the purchase of mercury sphygmomanometers.

Dental Restoration Material
● Dental amalgam is still considered to cost 25 – 50% less than composite fillings on average, however composite fillings continue to become more affordable with technical advancements. ● Dental insurance policies do not differentiate between the different types of dental restoration material and a fixed percentage reimbursement on procedures is typically offered. ● Parties and related stakeholders that provided information in preparation for COP-4 detailed that for global trends indicated that the price difference between mercury-added and mercury-free alternatives is already being reduced as improvements in techniques are made. Reference was also made to the additional costs and efforts required for handling dental amalgam waste disposal which have made dental amalgam use less economically feasible for practitioners in countries with waste management mechanisms in place.

Annex 2 – HS Codes of Relevant Consumer Products

Table A2: HS Codes for the Consumer Products of Concern under this Study.

Product Category	HS Code
Lighting Devices	
Fluorescent, hot cathode discharge lamps	8539.31.00
Mercury or sodium vapor lamps; metal halide lamps	8539.32.00
Other: Electrical discharge lamps, other than fluorescent (hot cathode), mercury or sodium vapor, metal halide or ultraviolet lamps	8539.39.00
Arc Lamps	8539.41.00
Other: Ultra-violet or infra-red lamps	8539.49.00
Light-Emitting Diode (LED) Lamps	8543.70.90
Electrical Switches and Relays	
Isolating Switches and Make-and-break Switches for a Voltage Exceeding 1,000 V	8535.30.00
"Other- Electrical apparatus for switching, protecting, or making connections for a voltage exceeding 1,000V"	8535.90.00
Relays for a voltage not exceeding 60 V	8536.41.00
Relays for a voltage greater than 60 V and not exceeding 1000 V	8536.49.00
Switches, for a voltage not exceeding 1,000 V	8536.50.00
Thermometers	
Liquid-filled thermometers and pyrometers (not combined with other instruments), for direct reading	9025.11.00
Other: (may include Digital thermometers)	9025.19.00
Blood Pressure Measuring Devices	
Other instruments and appliances- may include sphygmomanometers- Devices for measuring blood pressure	9018.90.00
Amalgams	
Amalgams of precious metals; etc.	2843.90.00

Mercury or Mercury Compounds	
Mercury	2805.40.00
*Note: Mercurochrome may be shipped under various product names including “Mercury Compound” or “Sodium Salts”. While HS Codes currently categorise “Mercury”, mercurochrome may be categorised under several other HS Codes that are listed under Chapter 28 of the Customs Act: “Inorganic Chemicals; Organic or Inorganic Compounds of Precious Metals, or Rare-Earth Metals, of Radioactive Elements or of Isotopes” or Chapter 30 “Pharmaceutical Products”.	

Annex 3 – Methodology Considerations: Market Study Challenges and Mitigation Measures

For the market study, the challenges for data collection and analysis were considered in order to better inform the methodology for this assessment. A summary is provided in the below table.

Table A3: Summary of Perceived Challenges in Stakeholder Survey Distribution and Measures Taken to Address Challenges

Perceived Challenge	**Measures Taken to Mitigate Challenges**
There was a general lack of data or lack of responsiveness from stakeholders.	User friendly formats for questionnaires and for dispensing project updates were utilised. Assistance from key members of the Saint Kitts & Nevis Bureau of Standards was sought to enhance stakeholder communication. Available data from related projects and desktop research was assessed where possible.

Annex 4 – Market Surveys

Surveys developed for this market survey were developed and distributed via Google Forms at the following link:

https://www.dropbox.com/sh/f1xtxng9eyu7pe1/AAA_Lf1DNaRqvicn3ihEkXwha?dl=0