



The Government of the Republic of
Trinidad and Tobago

TRINIDAD AND TOBAGO

UPDATED NATIONAL IMPLEMENTATION PLAN (NIP) 2018

**FOR THE STOCKHOLM CONVENTION ON
PERSISTENT ORGANIC POLLUTANTS (POPs)**

December 2018

Published 2019

Prepared on behalf of the Government of the Republic of Trinidad and Tobago in fulfilment of its obligations under the Stockholm Convention within the framework of the Project:

GEF 5558 “Development and Implementation of a Sustainable Management Mechanism for Persistent Organic Pollutants (POPs) in the Caribbean”

GEF Implementing Agency

United Nations Industrial Development Organization (UNIDO)

GEF Executing Agency

The Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC-Caribbean)

National Focal Point

Environmental Policy and Planning Division

Ministry of Planning and Development

Trinidad and Tobago

Prepared by:

Consultant: Camille Roopnarine

Environmental Health and Sustainable Development Department (EHS)

Caribbean Public Health Agency (CARPHA)

P.O. Box 1111

Morne Fortune, Castries,

Saint Lucia

Phone: 758 452 2501

Email: carphaslu@carpha.org



Acknowledgements

The Caribbean Public Health Agency, the consultant under the Global Environment Facility (GEF) funded consultancy assignment – “GEF 5558 Update of National Implementation Plans (NIPs) including Persistent Organic Pollutants (POPs) Inventories and Related Capacity Development for Eight (8) Caribbean Countries” - would like to acknowledge the implementing agency, the United Nations Industrial Development Organisation (UNIDO), and the executing agency, the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean), for the support provided in the update of the National Implementation Plan (NIP) in the Republic of Trinidad and Tobago. The contributions of the members of the GEF 5558 Project Working Committee (PWC) are recognized as follows:

- Ms. Keima Gardiner, PWC Chairperson, Ministry of Planning and Development
- Ms. Jiselle Joseph, National Project Coordinator (NPC), Environmental Management Authority (EMA)
- Ms. Trisha Beejai, NPC alternate, Environmental Management Authority
- Ms. Maria Allong, Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL)
- Mr. Tadis Dillon, Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL)
- Mr. Terrance Cournand, Pesticides and Toxic Chemicals Inspectorate (PTCI), Ministry of Health (MoH)
- Mr. Stephen Thomas, the Water Resources Agency (WRA),
- Mr. Deon Brebnor, the Department of Environment (DOE) of the Division of Infrastructure, Quarries and the Environment (DIQE), Tobago House of Assembly

The contributions of the BCRC-Caribbean and all other agencies and stakeholders that provided information during the consultations and workshops that guided the NIP update process on POPs in the Republic of Trinidad and Tobago are recognized and acknowledged.

EXECUTIVE SUMMARY

Introduction

Trinidad and Tobago, a twin-island state in the Caribbean with a population of approximately 1.4 million (Central Statistical Office, 2017), has an economy that is dominated by the petrochemical industry which includes the production and refining of crude oil and natural gas. Additionally, there are eleven ammonia plants, five methanol plants, one cement producer and one iron and steel mill in the country. There are also four power plants in Trinidad and one in Tobago.

The Ministry of the Planning and Development (MPD), as the National Focal Point to the Stockholm Convention on Persistent Organic Pollutants (POPs), is fulfilling its international commitments under the Convention and as such, has developed the updated National Implementation Plan (NIP) for Trinidad and Tobago.

POPs are a group of chemicals that have been produced both intentionally for use as pesticides and industrial performance chemicals, as well as unintentionally through various industrial activities such as petroleum refining and waste incineration. As the name suggests, once released into the environment, POPs can remain intact and last for years or even decades in the environment, as they can be widely distributed, and bio-accumulate in the food chain. POPs have highly toxic effects on both humans and wildlife. The Stockholm Convention is the global response and treaty that requires Parties to take measures to eliminate or reduce the release of POPs in order to protect human health and the environment from their harmful effects.

Development of the National Implementation Plan

Trinidad and Tobago acceded to the Stockholm Convention on 13th December 2002 and is obligated to submit a NIP that sets out a structured approach for fulfilling the country's obligations under the Convention. In 2013, the first NIP was completed and submitted to the Stockholm Convention Secretariat. An update to this NIP has been facilitated through a Project entitled **“Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean”** which was executed by the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean) with financial assistance from the Global Environment Facility (GEF).

The research that formed the basis of Trinidad and Tobago's updated NIP included (i) the previous NIP (GORTT, 2013), (ii) five POPs inventories that were conducted as part of this Project (BCRC-Caribbean, 2017) and (iii) the Draft Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (UNEP, 2017a).

Existing Framework

Trinidad and Tobago has a National Environmental Policy (NEP) which was revised and approved by Parliament in 2018. The Environmental Policy recognizes the country's obligations under the Stockholm Convention and espouses both the Polluter Pays Principle and the Precautionary Principle. However, as of 2018, there is no enabling legislation for the Stockholm Convention in Trinidad and Tobago.

The National Development Strategy “Vision 2030” is a national framework under which the country has placed care for the environment as a priority for socio-economic development up to the year 2030. Vision 2030 also strategically incorporates the United Nations (UN) Sustainable Development Goals (SDGs) under its key priority initiatives for implementation within this report.

While there is no framework specific to the management of POPs, these organic chemicals are presently being managed to some extent under the provisions of a number of laws including:

- The Pesticides and Toxic Chemicals Act and subsidiary legislation; and
- The Environmental Management Act and its subsidiary legislation.

In addition, the import of several POPs is presently regulated by the Ministry of Trade and Industry (MTI) through the Trade Licence Unit (TLU) which is responsible for administering the import of goods into and the export of goods out of Trinidad and Tobago (utilising the Negative List).

At present, the requirements of the Stockholm Convention are undertaken by the Ministry of Planning and Development (MPD), the National Focal Point and Official Contact Point.

Monitoring of POPs is confined to local and foreign laboratories, with local agents having the capacity to test for several, but not all, POPs.

Assessment of POPs issues in Trinidad and Tobago

The following is a summary of the POPs issues in the country:

Presence of POPs

- All **Annex A, Part I Pesticides** have been deregistered by the Pesticides and Toxic Chemicals Inspectorate (PTCI).
- **Polychlorinated biphenyls (PCBs)** were used extensively in electrical equipment, such as transformers, imported into Trinidad and Tobago before 1980. Some of this equipment might also contain **polychlorinated naphthalenes (PCNs)**. Many of these transformers and other equipment are reaching the end of their useful life and will need to be properly disposed upon decommissioning. The Stockholm Convention requires Parties to phase out the use of PCB in equipment by 2025 and ensure elimination of PCB by 2028. Trinidad and Tobago has set no country-specific phase-out date for PCBs.
- Other **Annex A, Part II Chemicals** either were never registered by the PTCI or have been deregistered.
- Of the Annex B Chemicals, **Dichlorodiphenyltrichloroethane (DDT)** was deregistered by the PTCI in 1990. **Perfluorooctane sulfonic acid (PFOS)** is still registered for use but is no longer used.
- The **unintentional POPs (UPOPs)** Inventory estimated a total production of 23g TEQ of unintentionally produced **polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/F)** in Trinidad and Tobago for the year 2016. The major releases were Ferrous and Non-Ferrous Metal Production (12 g TEQ/year; primarily through thermal wire reclamation), open burning processes (such as landfill and other fires at 4.9 g TEQ/year) and emission from waste incinerators (4.8 g TEQ/year). This inventory however, noted that information gaps existed such as missing information from companies that did not respond to the survey. Other gaps were that some agencies were not able to provide exact information, so estimates were used. This included estimates for landfill fires and thermal reclamation of copper.
- There are no POPs produced in Trinidad and Tobago, and Mirex-S is the only POP that has been imported (as an exemption under the Stockholm Convention). However, Mirex-S has not been imported for more than three years as alternatives are available, and as a result, no exemption has been registered.

- **PFOS and related substances** and listed **POP-Polybrominated diphenyl ethers (POP-PBDEs)** were found to be present in consumer articles used extensively in Trinidad and Tobago. These articles are either still in use or disposed of at the public disposal sites. A minor share is exported via waste electrical and electronic equipment (WEEE).

POPs Stockpiles and Contaminated Sites

- It appears that no stockpiles of POPs Pesticides are present in the country. However, there may be some chemical stockpiles that contain small amounts of POPs at the Forensic Science Centre. These chemicals can be disposed of as part of the GEF 5407 Project "Disposal of Obsolete Pesticides including POPs, Promotion of Alternatives and Strengthening Pesticides Management in the Caribbean" which is being implemented by the Food and Agricultural Organisation (FAO).
- No country-wide inventory of POPs-contaminated sites appears to be available, however, several potential sites were identified. The most important sites of note were the existing landfill and dumpsites as it has been the usual practice to dispose of all waste types at these sites.
- The landfills in Trinidad and Tobago have been identified as potential sources of POPs and UOPs to the air and leachate.

Monitoring of POPs

- No country-specific monitoring data for Annex A, Part 1 Pesticides in food or human tissue has been identified.
- There appear to be no routine national programmes to monitor releases of POPs, nor to monitor the environmental and human health effects of POPs. No country-wide specific studies on these effects appear to have been undertaken. However, under the Air Pollution Rules (2014) some companies would be obligated to monitor dioxins and furans.
- There are other initiatives being undertaken that also address POPs. One such example is that Trinidad and Tobago is part of the GEF 5407 Project "Disposal of Obsolete Pesticides including POPs, Promotion of Alternatives and Strengthening Pesticides Management in the Caribbean" which is being implemented by the Food and Agricultural Organisation (FAO).
- Trinidad and Tobago presently has the capability to undertake assessments and other studies described in Annexes D, E and F of the Stockholm Convention. Under the current system, the PTCI assesses new pesticides and issues licences for use by importers and re-sellers. There is a system established between the Focal Point and the Pesticides and Toxic Chemicals Inspectorate (PTCI), as it relates to those chemicals that would fall under the purview of the latter, to determine the status of the chemicals proposed for listing before a decision is made at the Conference of the Parties to the Stockholm Convention (COP). The same would not apply however, for industrial chemicals contained in products, as the PTCI would not have this capacity.
- Trinidad and Tobago presently has the capability to treat and dispose of some POPs in an environmentally responsible manner. There are hazardous and medical waste incinerators that are managed by both the public and private sector.

Public Awareness

- Since the last NIP was developed, the Environmental Policy and Planning Division (EPPD) has published public awareness materials on POPs. The PTCI has published material on pesticide use on the Ministry of Health's website.

- No initiatives of Non-Government Organizations (NGOs) specific to the Stockholm Convention or POPs were identified.

Key/Priority Actions under the NIP

The following is a summary of key actions recommended in this NIP, which can be taken over the next six (6) years (2018 to 2023, inclusive). This period was chosen as it reflects an adequate time period in which short- and medium-term initiatives can be put in place.

- The overall estimated budget for implementing the recommended activities is **US\$5,360,000.00**. The budgets were determined based on estimations and reviews of similar activities included in other action plans. The budgets included are indicative as in some instances, it is not possible to determine costs until after assessments have been completed. In the case of PCBs/PCNs, the cost of export and final disposal was not reflected in the budget.
- There are some activities that are overarching, and these should be given priority, as completing these actions would be critical for the success of the other actions.

Table ES-1: Summary of Key/Priority Actions

AREA	SUMMARISED ACTIVITIES	BUDGET US\$
Institutional and Regulatory Strengthening	1. Enact local enabling legislation for the Stockholm Convention.	55,000
	2. Develop a co-ordinating mechanism for chemicals and waste.	
	3. Assess and set responsibilities of ministries and other relevant agencies for the life cycle management of POPs and other hazardous chemicals based on the Strategic Approach to International Chemicals Management (SAICM) and their waste (Basel Convention).	
Pesticides	1. Develop an adequate legislative framework and policy for POPs pesticides.	900,000
	2. Update and refine the inventory of POPs pesticides.	
	3. Develop a system for life cycle management of POPs pesticides and highly hazardous pesticides (HHPs).	
	4. Increase education and awareness of stakeholders (policy makers, Customs and Excise Division, farmers, NGOs and the public) on POPs pesticides.	
	5. Establish monitoring and analysis of POPs pesticides and HHPs.	
PCBs/PCNs	1. Develop and implement a legislative framework, policy and measures for control and management of PCBs and PCNs in closed and open applications (equipment, materials and wastes).	380,000
	2. Develop and continuously update the PCB/PCN inventory in closed and open applications where necessary.	
	3. Develop life cycle management (handling, storage, transport and disposal) of PCBs/PCNs, PCB/PCN-containing	

AREA	SUMMARISED ACTIVITIES	BUDGET US\$
	equipment, open applications and PCB/PCN containing and contaminated wastes.	
	4. Increase education and awareness of stakeholders (policy makers, customs, related industries, NGOs and the public) on PCBs/PCNs in closed and open applications.	
POP-PBDEs	1. Establish a regulatory framework for management of POP-PBDEs (hazardous chemicals) and related articles and waste categories.	890,000
	2. Update and refine the inventory of PBDEs (with DecaBDE) and Hexabromocyclododecane (HBCD) containing articles and wastes/resources.	
	3. Develop or update appropriate databases for information management.	
	4. Develop sound life cycle management of PBDE and HBCD product and waste categories (EEE/WEEE, end of life vehicle, insulation foam, and possibly textiles, furniture, etc.).	
	5. Conduct education exercises and training of major stakeholders on POP-brominated flame retardants (BFR) containing products and waste created (integrated in the overarching framework on awareness of chemicals in products).	
	6. Test POP-BFR in the affected environments.	
PFOS and related substances and other PFAS¹ (SAICM synergy)	1. Establish a policy and regulatory framework for the use, management and substitution of PFOS and related substances in industrial uses and in products and waste.	360,000
	2. Update and refine the inventory of PFOS and other PFAS use and containing articles and wastes.	
	3. Develop a database for information management on PFOS and related compounds.	
	4. Establish monitoring of PFOS and other PFAS in priority areas.	
	5. Conduct training and awareness raising for stakeholder groups on PFOS.	
	6. Establish an approach for information exchange.	
UPOPs	1. Update the policy and legal framework for reduction and minimization of UPOPs.	1,095,000
	2. Update source inventories for UPOPs and ensure data is appropriately managed and harmonized with other release inventories.	

¹Currently only PFOS and related substances (precursors) are listed in the Stockholm Convention. PFOA has been evaluated by the POP Review Committee and is suggested for listing. SAICM has PFAS as an issue of concern.

AREA	SUMMARISED ACTIVITIES	BUDGET US\$
	3. Conduct awareness training and education activities.	
	4. Reduce UPOPs by substitution of chemicals and materials responsible for releases.	
	5. Establish a monitoring programme for UPOPs and relevant pollutants from Annex C, Parts II and III sources and human exposure.	
Specific Exemptions	1. Assess if exemptions are necessary.	25,000
	2. Conduct periodic reviews.	
Stockpiles	1. Evaluate options for destruction of stockpiles.	200,000
	2. Develop manuals.	
	3. Establish collection schemes.	
	4. Destroy stockpiles.	
Contaminated Sites	1. Establish a framework for management of contaminated sites.	825,000
	2. Develop a methodology to identify, assess and prioritize sites contaminated with Annex A, B and C chemicals.	
	3. Secure POPs contaminated sites, and where feasible, develop remediation plans for contaminated sites.	
	4. Establish a countrywide database for POPs contaminated sites considering relevant co-pollutants.	
Public Awareness and Education	1. Revise current content in schools to educate students about POPs and the dangers and risks involved.	75,000
Capacity Building	1. Develop capacity of the PTCL.	480,000
	2. Develop capacity and procure equipment for laboratories.	
	3. Develop capacity for other agencies.	
Effectiveness Evaluation	1. Conduct monitoring of POPs in human milk or blood.	60,000
	2. Develop other evaluation criteria to determine effectiveness of the Convention implementation.	
Reporting to the Stockholm Convention	1. Compile information and submit report.	15,000
TOTAL		5,360,000

Table of Contents

Table of Contents	vii
1 INTRODUCTION.....	1
1.1 Overview on Persistent Organic Pollutants (POPs).....	1
1.2 The Stockholm Convention	1
1.2.1 Rationale	1
1.2.2 Overview of the Stockholm Convention	1
1.2.3 POPs listed under the Stockholm Convention	3
1.2.4 Progress to date in implement the Convention	4
1.3 Trinidad and Tobago National Implementation Plan (NIP)	4
1.3.1 Purpose of the NIP and predecessor studies	4
1.3.2 Structure of the NIP.....	5
1.3.3 The NIP Development Methodology	5
1.3.4 National Implementation Plans and Socio-Economic Assessments.....	7
1.3.5 Gender Policy in the NIP Development and Implementation.....	8
1.3.6 Limitations	9
2 COUNTRY BASELINE.....	1
2.1 Country Profile.....	1
2.1.1 Geography and Population	1
2.1.2 Political and Economic Profile	2
2.1.3 Profile of Economic Sectors	2
2.1.4 Environmental Priorities	4
2.2 Policy and Regulatory Framework	5
2.2.1 Policies and General Legislative Framework.....	5
2.2.1.1 National Environmental Policy (NEP).....	5
2.2.2 Roles and Responsibilities of Governmental Entities	5
2.2.2.1 The Ministry with Responsibility for the Environment	6
2.2.2.2 The Ministry of Energy and Energy Industries	6
2.2.2.3 The Pesticides and Toxic Chemicals Control Board.....	6
2.2.2.4 The Ministry of Agriculture, Land and Fisheries.....	6
2.2.2.5 The Ministry of Trade and Industry	6
2.2.2.6 The Customs and Excise Division, Ministry of Finance	7
2.2.2.7 The Environmental Management Authority.....	7
2.2.2.8 The Department of Environment, Division of Infrastructure, Quarries and the Environment, Tobago House of Assembly.....	7
2.2.2.9 Management Agencies for Solid Waste	7
2.2.2.10 Summary of Roles and Responsibilities.....	7

2.2.3	Relevant International Commitment and Obligations.....	8
2.2.3.1	The Basel Convention	9
2.2.3.2	The Rotterdam Convention	9
2.2.3.3	The Minamata Convention on Mercury	10
2.2.3.4	The Montreal Protocol	10
2.2.3.5	Existing Legislation and Regulation Addressing POPs (manufactured chemicals and unintentionally produced POPs)	10
2.2.3.6	Pesticides and Toxic Chemicals Act and Regulations	10
2.2.3.7	EMA - Certificate of Environmental Clearance (CEC) Rules	11
2.2.3.8	EMA - Water Pollution Rules.....	11
2.2.3.9	EMA's Air Pollution Rules	11
2.2.3.10	National Solid Waste Policy and Strategic Plan.....	11
2.2.3.11	Draft Waste Management Rules	12
2.2.3.12	Import Negative List	12
2.2.4	Key Approaches and Procedures	12
2.2.4.1	Enforcement and Monitoring	12
2.2.4.2	Industry Practices	13
2.2.4.3	Training	14
2.3	Assessment of POPs in Trinidad and Tobago	15
2.3.1	Assessment of POPs Pesticides (Annex A, Part I)	15
2.3.2	Assessment of Polychlorinated Biphenyls (PCBs) (Annex A, Part II) and Polychlorinated Naphthalenes PCNs (Annex A, Part I).....	17
2.3.3	Assessment of Polybrominated Diphenyl Ethers (POP-PBDEs) (Annex A, Part IV and V), Hexabromobiphenyl (HBB) (Annex A, Part I) and Hexabromocyclododecane (HBCD) (Annex A, Part I and Part VII)	18
2.3.4	Assessment of Hexachlorobutadiene (HCBD) (Annex A, Part I)	21
2.3.5	Assessment of Dichlorodiphenyltrichloroethane (DDT) (Annex B, Part II)	21
2.3.6	Assessment of Perfluorooctane Sulfonic Acid (PFOS), Its Salts and Related Substances (Annex B, Part III).....	21
2.3.7	Assessment of Releases of Unintentionally Produced POPs (UPOPs)	23
	(Annex C)	23
2.3.8	Stockpiles, Contaminated Sites and Wastes	25
2.3.8.1	POPs Pesticides Contaminated Sites	25
2.3.8.2	PCBs Contaminated Sites.....	26
2.3.8.3	POP-PBDE, HBB and HBCD Waste Management and Contaminated Sites and Hotspots	29
2.3.8.4	PFOS Contaminated Sites	30
2.3.8.5	PCDD/PCDF and UPOPs Contaminated Sites.....	31
2.3.9	Future Production and Use of POPs – Requirement for Exemption.....	33

2.3.10	Monitoring Programmes	33
2.3.11	Information, Awareness and Education	34
2.3.12	Mechanism to Report Under Article 15 on Measures Taken to Implement the Provisions of the Convention	35
2.3.13	Information Exchange with Other Parties	36
2.3.14	Relevant Activities of Non-Governmental Organisations (NGOs)	36
2.3.15	Overview of Technical Infrastructure for POPs Assessment, Measurement, Analysis, Alternatives and Prevention Measures, Research and Development – Linkage to International Programmes and Projects.....	36
2.3.16	Overview of Technical Infrastructure for POPs Management and Destruction	36
2.3.16.1	Waste Disposal Capacity	37
2.3.16.2	Assessment Capability	37
2.3.17	Impacted Populations and Environments	37
2.3.18	Assessment and Listing of New Chemicals	38
2.3.19	Chemicals Already in the Market	38
2.4	Implementation Status	38
2.4.1	Institutional Framework	38
3	STRATEGY AND ACTION PLAN ELEMENTS.....	41
3.1	Recommended Policy Statement.....	41
3.2	Implementation Strategy	42
3.3	Activities, Strategies and Action Plans.....	42
3.3.1	Activity: Institutional and regulatory strengthening measures.....	43
3.3.2	Activity: Measures to reduce or eliminate Releases from Intentional Production and Use	44
3.3.3	Activity: Production, Import and Export, Use, Stockpiles, Export and Waste of Annex A POPs Pesticides (Annex A, Part I Chemicals)	45
3.3.4	Activity: Production, import and export, use, identification, labelling, removal, storage, and disposal of PCBs and equipment containing PCBs (Annex A, Part II Chemicals)	48
3.3.5	Activity: Production, Import and Export, Use, Stockpiles, and Wastes of POP-PBDEs (Annex A, Part IV & V Chemicals), HBCD and HBB (Annex A, Part I Chemical)	50
3.3.6	Activity: Production, import and export, use, stockpiles and wastes of DDT (Annex B Chemicals) (if Used in the Country)	53
3.3.7	Activity: Production, import and export, use, stockpiles and wastes of PFOS, its salts and PFOS-F (Annex B, Part III Chemicals)	53
3.3.8	Activity: Register for specific exemptions and the continuing need for exemptions (Article 4)	56
3.3.9	Activity: Measures to reduce releases from unintentional production (UPOPs) (Article 5)	57
3.3.10	Activity: Identification and management of stockpiles, waste and articles in use, including reduction of releases and appropriate measures for handling and disposal (Article 6).....	61
3.3.11	Activity: Identification of Contaminated Sites (Annex A, B, and C Chemicals) and, Where Feasible, Remediation of Identified Sites in an Environmentally Sound Manner	63

3.3.12	Activity: Facilitation or Undertaking of Information Exchange and Stakeholder Participation	65
3.3.13	Activity: Public awareness, information and education	67
3.3.14	Activity: Effectiveness evaluation	68
3.3.15	Activity: Reporting	69
3.3.15.1	Registering chemicals and exemptions.....	70
3.3.16	Activity: Research, Development and Monitoring	71
3.3.17	Activity: Technical and Financial Assistance	71
3.3.17.1	Technical Assistance.....	71
3.3.17.2	Financial Assistance.....	71
3.4	Development and Capacity-building Proposals and Priorities	72
3.5	Timetable for Plan Implementation and Measures of Success.....	72
3.6	Resource Requirements	73
LIST OF REFERENCES		75

List of Tables

Table 1: Listing of POPs in the Stockholm Convention (as of 2017)	3
Table 2 Summary of roles and responsibilities of institutions involved in chemical and waste management	8
Table 3: Local laboratory capacity for testing POPs	13
Table 4: Status of the use of POPs pesticides in Trinidad and Tobago	16
Table 5: Estimated total weight of c-OctaBDE, heptaBDE and hexaBDE for CRTs in households in Trinidad and Tobago	19
Table 6: Total amount of c-PentaBDE (TetraBDE, PentaBDE, HexaBDE and HeptaBDE) in all impacted vehicles in Trinidad and Tobago for 1985 – 2010	20
Table 7: Quantity of firefighting foams identified and their brand names.	22
Table 8: Total 2016 annual releases (g TEQ/year) for the ten source groups of UOPs (2016)	24
Table 9: Potentially contaminated sites in Trinidad and Tobago	26
Table 10: Site locations and GPS Coordinates for PCB contaminated sites.....	27
Table 11: Locations of sites that are potentially contaminated or impacted with POPs-PBDEs	30
Table 12: Locations of potentially PFOS contaminated sites in Trinidad and Tobago	31
Table 13: Potential PCDD/PCDF contaminated sites in Trinidad and Tobago.....	32
Table 14: NIP Implementation Status	39
Table 15: Action Plan items for Institutional and Regulatory Strengthening.....	43
Table 16: Action Plan for POPs Pesticides	45
Table 17: Action Plan for PCBs.....	48
Table 18: Action Plan for POP-PBDEs, HBCD and HBB	51
Table 19: Action Plan for PFOS and Related Substances	54
Table 20: Register for specific exemptions and continuing need for exemptions (Article 4)	56
Table 21: Action Plan for UOPs reduction.....	58
Table 22: Action Plan to reduce releases from Stockpiles and Wastes (Article 6)	62
Table 23: Action Plan for Contaminated Sites	63
Table 24: Action Plan for facilitating Information Exchange and Stakeholder Participation	66
Table 25: Action plan for public awareness, information and education	68
Table 26: Effectiveness evaluation (Article 16).....	68
Table 27: Action Plan for Reporting under Article 15 of the Stockholm Convention	70
Table 28: Action plan for capacity building	72
Table 29: Resources and Availability	73

List of Figures

Figure 1:Trinidad and Tobago's location in the West Indies (source GORTT, 2013).....	1
Figure 2: Major Industrial Estates in Trinidad and Tobago (source GORTT, 2013)	3
Figure 3: Landfill Sites in Trinidad and Tobago (source: SWMCOL).....	4
Figure 4: A transformer found to contain PCB oil, labelled as a PYRANOL Transformer. (Source: BCRC-Caribbean).....	18
Figure 5: Sample Locations for Sea Lots in the Port of Spain Harbour and References at Caroni and Manzanilla (source: Mohammed et al., 2011).....	28
Figure 6: Summary of Potentially POPs Contaminated Sites in Trinidad and Tobago.....	33
Figure 7: POPs Information Posters developed by the EPPD.....	35

LIST OF ACRONYMS

ACRONYM	MEANING
AATT	Airport Authority of Trinidad and Tobago
AGLA	Ministry of Attorney General and Legal Affairs
ASTT	Agricultural Society of Trinidad and Tobago
Basel Convention	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
BAT	Best Available Techniques
BCRC-Caribbean	Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean
BEP	Best Environmental Practices
BFR	Brominated Flame Retardants
CARIRI	Caribbean Industrial Research Institute
CARPHA	Caribbean Public Health Agency
CEC	Certificate of Environmental Clearance
CFDD	Chemistry Food and Drug Division of the Ministry of Health
COP	Conference of Parties
CRT	Cathode Ray Tube
CTO	Chief Technical Officer
DDT	Dichlorodiphenyltrichloroethane
DIQE	Division of Infrastructure, Quarries and the Environment
DOE	Department of Environment, Tobago House of Assembly
dw	Dry Weight
EEE	Electrical and Electronic Equipment
EMA	Environmental Management Authority
EPPD	Environmental Policy and Planning Division
ESM	Environmentally Sound Management
e-waste	Electronic waste
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEF 5558	“Development and Implementation of a Sustainable Management Mechanism for Persistent Organic Pollutants (POPs) in the Caribbean” Project
GHS	Global Harmonised System

GORTT	Government of the Republic of Trinidad and Tobago
gTEQ /year	Grams Toxic Equivalency per year
HazMat	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBB	Hexabromobiphenyl
HBCD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HCBD	Hexachlorobutadiene
HHP	Highly Hazardous Pesticides
IMA	Institute of Marine Affairs
MALF	Ministry of Agriculture, Land and Fisheries
MEAU	Multilateral Environmental Agreements Unit
MEEI	Ministry of Energy and Energy Industries
MMscf	Million standard cubic feet
MoH	Ministry of Health
MoWT	Ministry of Works and Transport
MPD	Ministry of Planning and Development
MPU	Ministry of Public Utilities
MSDS	Material Safety Data Sheets
MTI	Ministry of Trade and Industry
NEP	National Environmental Policy
NGOs	Non-governmental Organisations
NIP	National Implementation Plan
NPC	National Project Coordinator
ODS	Ozone Depleting Substances
OECD	Organisation for Economic Co-operation and Development
OESH	Occupational and Environmental Safety and Health
OSHA	Occupational Safety and Health Agency
PAHs	Polycyclic Aromatic Hydrocarbons
PA/PE	Public Awareness/Public Education
PBDEs	Polybrominated Diphenyl Ethers
PC	Personal Computer
PCBs	Polychlorinated Biphenyls

PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PCNs	Polychlorinated Naphthalenes
PCP	Pentachlorophenol
PeCB(z)	Pentachlorobenzene
PETROTRIN	Petroleum Company of Trinidad and Tobago
PFAS	Per- and polyfluoroalkyl Substance
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane sulfonic Acid
PFOS-F	Perfluorooctane Sulfonyl Fluoride
PIC	Prior Informed Consent
POP	Persistent Organic Pollutant
POPRC	POPs Review Committee
PPP	Polluter Pays Principle
PTCCB	Pesticides and Toxic Chemicals Control Board
PTCI	Pesticides and Toxic Chemicals Inspectorate
PTS	Persistent Toxic Substances
PWC	Project Working Committee
RHA	Regional Health Authority
Rotterdam Convention	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals in International Trade
SAICM	Strategic Approach to International Chemicals Management
SCCPs	Short Chain Chlorinated Paraffins
SC-ERS	Stockholm Convention - Electronic Reporting System
SEA	Socio-economic Assessment
Stockholm Convention (SC)	Stockholm Convention on Persistent Organic Pollutants
SWMCOL	Trinidad and Tobago Solid Waste Management Company Limited
T&TEC	Trinidad and Tobago Electricity Commission
THA	Tobago House of Assembly
TTBS	Trinidad and Tobago Bureau of Standards
TTEMAS	Trinidad and Tobago Emergency Mutual Aid Scheme
TTMA	Trinidad and Tobago Manufacturers Association
UNEP	United Nations Environment Programme

UNIDO	United Nations Industrial Development Organisation
UPOPs	Unintentionally Produced POPs
UTT	University of Trinidad and Tobago
UWI	University of the West Indies
WASA	Water and Sewerage Authority
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organisation
WRA	Water Resources Agency

1 INTRODUCTION

Chapter one (1) outlines the purpose and structure of the National Implementation Plan (NIP), including a summary of the Stockholm Convention (SC), its aims and the obligations of a Party. It also describes the mechanism used to develop the NIP and the stakeholder consultation process. A summary of the Persistent Organic Pollutants (POPs) issue provides the context and background by outlining the chemicals, their uses and the problems they cause.

1.1 Overview on Persistent Organic Pollutants (POPs)

Persistent organic pollutants (POPs) are a group of highly hazardous organic chemicals, including pesticides, industrial chemicals and some unintended by-products of chemical and combustion processes.

POPs possess the following characteristics:

- they are highly toxic to humans and wildlife (harmful);
- they can last for many years in the environment before degrading into less dangerous forms (persistence);
- they bioaccumulate in organisms and biomagnify up food chains (bioaccumulation and biomagnification); and
- they are transported over long distances through air and water and can be found worldwide (long-range transport).

1.2 The Stockholm Convention

1.2.1 Rationale

The objective of this Convention is to protect human health and the environment from POPs (UNEP, 2017b). Obligations under the Convention include:

- Eliminating or restricting the production and use of the intentionally produced POPs;
- Prohibiting or eliminating the import, production or use of POPs;
- Conducting research;
- Identifying areas contaminated with POPs; and
- Providing financial support and incentives for the Convention.

This National Implementation Plan (NIP) sets out a structured approach for Trinidad and Tobago to fulfil its obligations under the Stockholm Convention (SC). This is an update of the previous NIP that was submitted to the SC in 2013.

1.2.2 Overview of the Stockholm Convention

On 13th December 2002, Trinidad and Tobago acceded to the Stockholm Convention (SC) on Persistent Organic Pollutants (POPs). The SC is a multilateral environmental agreement aimed at protecting human health and the environment from the risks posed by POPs. Although initially developed for a list of twelve (12) chemicals, the SC established long-term objectives and procedures for the of listing additional POPs that would be subject to international obligations to reduce or eliminate production and use. According to Paragraph 9 of Article 8 of the SC, based on the risk profiles and the risk management evaluations for chemicals, fourteen (14) additional POPs were added between 2009 and 2015 (UNEP, 2017b). These fourteen POPs are:

- Alpha hexachlorocyclohexane (alpha-HCH);
- Beta hexachlorocyclohexane (beta-HCH);
- Lindane (gamma-HCH);
- Chlordecone;

- Technical Endosulfan and its related isomers;
- Pentachlorophenol (PCP), its salts and esters;
- Homologues of commercial PentaBDE
- Pentabromodiphenyl ether (PentaBDE)
- Tetrabromodiphenyl ether (tetraBDE);
- Homologues of commercial octabromodiphenyl ether (OctaBDE)
- hexabromodiphenyl ether (hexaBDE) and
- heptabromodiphenyl ether (heptaBDE);
- Hexabromobiphenyl (HBB);
- Hexabromocyclododecane (HBCD);
- Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOS-F);
- Hexachlorobutadiene (HCBd);
- Pentachlorobenzene (PeCBz); and
- Polychlorinated Naphthalenes (PCNs).

The Convention requires that Parties prohibit and/or take legal administrative measures to eliminate the production, use, import and export of chemicals listed in Annex A of the Convention, and to limit the importation of chemicals listed in Annexes A and B to purposes of environmentally sound disposal or for a use-specific exemption as permitted by the Convention. It also seeks the continuing minimisation and ultimate elimination of releases of unintentionally produced POPs.

The Convention addresses:

- a) Intentionally produced chemicals such as pesticides, insecticides, rodenticides and fungicides.
- b) Intentionally produced chemicals whose use is restricted to disease vector control, for example Dichlorodiphenyltrichloroethane (DDT) for control of malaria.
- c) Unintentional persistent organic pollutants produced and released unintentionally as a result of human activity.

Unintentionally produced POPs (UPOPs) include such chemicals as polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzo-furans (PCDF), more commonly referred to as dioxins and furans; hexachlorobenzenes (HCBs); polychlorinated biphenyls (PCBs), pentachlorobenzenes (PeCB) and polychlorinated naphthalenes (PCNs).

The goal of the Convention in relation to UPOPs, is to minimize production of and, where feasible, ultimately eliminate the total releases of these substances derived from anthropogenic sources. In order to achieve this goal, Parties to the Convention are required to promote and, where appropriate, require the use of substitute or modified materials, products and processes to prevent the formation and release of UPOPs, and promote the use of best available techniques (BAT) and best environmental practices (BEP) for the management of UPOPs.

In order for the SC to achieve its objective in protecting human health and the environment, a precautionary approach is incorporated in dealing with toxic pollutants. Thus, the Convention also defines criteria for including new chemicals based on their persistence, bioaccumulation, potential for long-range transport and adverse effects. A POPs Review Committee (POPRC) regularly considers additional candidates for the POPs list. Any Party can propose a new listing by stating the reasons for its concern, and in turn, the POPRC will utilize the screening provisions to make recommendations to Parties in response to such submissions.

1.2.3 POPs listed under the Stockholm Convention

Table 1 below lists POPs under specific Annexes as follows (UNEP, 2017b):

Annex A – these are chemicals listed mainly for the elimination of its production and use. Specific exemptions for use or production are listed in the Annex and apply only to Parties that register for them.

Annex B – Parties must take measures to restrict the production and use of these POPs chemicals; Parties may register specific exemptions or restrict use to an “acceptable purpose” as stated by the Convention.

Annex C – these are unintentionally produced POPs (or UPOPs) which Parties must take measures to reduce their unintentional releases with the goal of continuing minimization and, where feasible, ultimate elimination.

Table 1: Listing of POPs in the Stockholm Convention (as of 2017)

	Listed Chemical	Annex	Pesticide	Industrial Chemical	Unintentional by-product
1	Aldrin	A	♦		
2	Chlordane	A	♦		
3	Chlordecone	A	♦		
4	Decabromodiphenyl ether (commercial mixture, c-decaBDE	A		♦	
5	DDT	B	♦		
6	Dieldrin	A	♦		
7	Endrin	A	♦		
8	Heptachlor	A	♦		
9	Hexabromobiphenyl	A		♦	
10	Hexabromocyclododecane	A		♦	
11	Hexabromodiphenyl ether and heptabromodiphenyl ether	A		♦	
12	Hexachlorobenzene	A & C	♦	♦	♦
13	Hexachlorobutadiene	A		♦	♦
14	Alpha-hexachlorocyclohexane	A	♦		
15	Beta-hexachlorocyclohexane	A	♦		
16	Lindane	A	♦		
17	Mirex	A	♦		

Listed Chemical		Annex	Pesticide	Industrial Chemical	Unintentional by-product
18	Pentachlorobenzene	A & C	♦	♦	♦
19	Pentachlorophenol and its salts and esters	A	♦		
20	Perfluorooctane sulfonic acids and salts and Perfluorooctane sulfonyl fluoride	B	♦	♦	
21	Polychlorinated biphenyls	A & C		♦	♦
22	Polychlorinated dibenzo-p-dioxins	C			♦
23	Polychlorinated dibenzofurans	C			♦
24	Polychlorinated naphthalenes	A & C		♦	♦
25	Short-chain chlorinated paraffins	A		♦	
26	Technical endosulfan and its related isomers	A	♦		
27	Tetrabromodiphenyl ether and pentabromodiphenyl ether	A		♦	
28	Toxaphene	A	♦		

1.2.4 Progress to date in implement the Convention

Trinidad and Tobago submitted its first NIP in 2013 (GORTT, 2013) to the Stockholm Convention and subsequently embarked upon a public education and awareness campaign on POPs. Since then, the country has also disposed of a stockpile of DDT in 2005 using environmentally sound management techniques and has been engaged with the Food and Agriculture Organization (FAO) in a project to dispose of other obsolete pesticides and PCBs.

In 2015, the Global Environment Facility (GEF) approved financial support for the implementation of the regional project, “Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean” which is an integrated project for the Caribbean region. UNIDO is the implementing agency, and the BCRC-Caribbean is the executing agency in this project. The project aims to build both institutional and human resource capacity to deal with the impact of POPs and unintentionally produced POPs (UPOPs) in eight (8) of the Caribbean countries which are Parties to the SC, including Trinidad and Tobago. The project’s first component is to deliver Updated NIPs for the participating countries.

1.3 Trinidad and Tobago National Implementation Plan (NIP)

1.3.1 Purpose of the NIP and predecessor studies

The previous 2013 NIP was examined and, where feasible, was reviewed and updated to form the basis for the updated NIP. The inventory for UPOS for the NIP was also updated from the previous 2011 inventory. Four additional inventories for POPs groups were conducted. These were for listed

polybrominated diphenyl ethers (POP-PBDEs), POPs pesticides, polychlorinated biphenyls (PCBs) and perfluorooctane sulfonic acid (PFOS) and related substances (precursors).

1.3.2 Structure of the NIP

This National Implementation Plan (NIP) conforms to the guidance provided by the Secretariat of the Stockholm Convention, Draft Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (UNEP, 2017a), and consists of three (3) chapters.

Chapter 1 gives a definition of POPs and explains its relevance to Trinidad and Tobago. It presents an overview of the SC including the listed POPs under this Convention. This chapter also describes the process for the development of the NIP and its structure.

Chapter 2 presents Trinidad and Tobago's country baseline and profile; particularly its demographic, political and economic status. It elaborates on the environmental situation and the current status of the institutional, policy and regulatory framework. This chapter also presents the results of the assessment of POPs, focusing on the import and export, production, current and future use, registration, release, storage, disposal, and the potential impact. Additionally, this chapter presents the existing programmes available for monitoring POPs in Trinidad and Tobago, the information exchange and awareness mechanisms as well as the status of the NIP action plans.

Chapter 3 outlines the activities, strategies and action plan elements of the NIP. In addition, a budget related to the activities of the action plan is included. It also presents development and capacity-building proposals and priorities, a timetable for the implementation plan, indicators of success and resource requirements.

1.3.3 The NIP Development Methodology

The plan is structured on the recommendations of the Draft Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (UNEP, 2017a). The process of updating a NIP is subdivided into five (5) phases:

Phase I – Establishment of Coordinating Mechanism and Organization Process

In order to successfully update the NIP, it requires that an effective project planning and management structure be put in place. Phase I laid out steps to provide a firm base from which to update the NIP.

The key objectives of this phase of the project were as follows:

- To raise awareness within Government entities of the POP issues, the SC, new POPs added to the Convention, and the need to update the NIP. ^[11]
- To raise awareness of the POP issues with non-governmental stakeholders.
- To achieve sufficient political commitment to enable the successful update of the NIP.
- To establish a structure and mechanism for planning, managing and supervising the update of the NIP. This included the establishment of a Project Working Committee (PWC) and the appointment of a Chair and National Project Coordinator (NPC) under this Committee
- To produce a detailed project plan for updating the NIP. This was led by the Caribbean Public Health Agency (CARPHA) and finalised by the National Lead designated by CARPHA.
- To plan, initiate and sustain an information dissemination campaign.

Phase II – Establishment of basic and newly listed POPs Inventories and Assessment of National Infrastructure and Institutional Capacity to manage new POPs

The key objectives of this phase of the project were as follows:

- To obtain, review and summarize information on the sources, use and production of POPs, including their presence in stockpiles and wastes, and determine the baseline situation.

- To identify the gaps in resources, capacity and knowledge that prevents the complete assessment of the status of POPs.
- To identify whether or not the requirements of the SC are met.
- To fulfil reporting obligations under the SC.
- To identify the technical and financial assistance needed to complete the update and implementation of the NIP.
- To facilitate coordination and integration with national sustainable development, chemicals management, and pollution control policies.
- To facilitate coordination, as appropriate, with activities addressing other multilateral environmental agreements (MEAs), for example, the Rotterdam and Basel Conventions.

Inventories for the five (5) POPs groups were developed based on the current situation of POPs in Trinidad and Tobago related to sources, use, production, presence of stockpiles and waste. Information was gathered from the key stakeholders and the national partners including public and private sector agencies, non-governmental organizations (NGOs) and regional partners. The gaps in resources, capacity and knowledge for each group of POPs were included. Additionally, the inventories included information on general chemical management, pollution control and related policies in the country. The guidance for the development of inventories came from the United Nations Environment Programme (UNEP) guidance documents for the Stockholm Convention.

The development of the POPs inventories consisted of five (5) steps:

- 1) Planning the inventory;
- 2) Selecting the data collection methodology;
- 3) Collecting and compiling data from key sectors;
- 4) Managing and evaluating the data; and
- 5) Preparing the inventory report.

A POPs initiation workshop in Trinidad and Tobago on January 24, 2017 signalled the commencement of the development of the POPs inventories. The participants of the workshop were from Government, the private sector and NGOs. Personnel from CARPHA, the BCRC-Caribbean and the Ministry of Planning and Development (MPD) facilitated the workshop. The objective of the workshop was to raise awareness at the national level of POPs and provide exposure to stakeholders on the process and methodology for developing and updating the national POPs inventories (with special emphasis on the 16 new POPs).

Following the inventory development, the POPs inventories were validated and endorsed at the Regional POPs Inventories Validation Workshop (November 16-17, 2017) for all participating countries. The important considerations during the inventory validation process were the use of representative data, appropriate conclusions, addressing of reviewers' (CARPHA, PWC, and BCRC-Caribbean), comments/queries and approval of draft reports by both the BCRC-Caribbean and the PWC.

Phase III – Priority Assessment and Objective Setting

The priority assessment of the individual POP groups was based on key information on POPs, the POPs situation in the country using the findings from the POPs inventories, the relevance to the region and, where appropriate, the relevance of available data on POPs levels in human milk or blood. The major criteria for the assessment of the individual POPs were toxicological relevance to human health and biota/wildlife, relevance of co-pollutants and affected waste, and socio-economic relevance.

The approach to priority assessment and objective setting was one which engaged the national partners and key stakeholders in priority setting and action planning for POPs during three (3) one-day consultation workshops in Port of Spain, San Fernando and Tobago (January 23-25, 2018). Additional consultations were also conducted with specific stakeholder groups.

The key objectives of this phase of the project were:

- To develop country-specific criteria for prioritizing health and environmental impacts of POPs;
- To assess the available information from phase II in order to identify priority areas for attention;
- To identify data and other gaps in the information available that prevents a full priority assessment from being carried out;
- To review national priorities and make adjustments accordingly;
- To set appropriate action plans with short-, medium-, and long-term objectives, goals and measurable indicators for the management of POPs in compliance with the SC with consideration to the Rotterdam and Basel Conventions.

Phase IV – Formulation of National Implementation Plan

The key objectives of this phase of the project included:

- Information gathering on possible options for management of POPs;
- The prioritization of the options available and actions necessary to meet the requirements of the SC and country objectives;
- Updating the draft NIP suitable for the country to meet the requirements of the SC and its specific objectives and priorities, coordinated with national activities on sustainable development and related goals, where appropriate;
- The identification of requirements for assistance in the completion of additional assessments and information gathering to complete and implement the NIP.

Phase V – NIP Endorsement and Submission

The key objectives of this phase of the project were:

- To communicate clearly the scope and objectives of the NIP;
- To consult with all stakeholders on the proposed NIP, as appropriate;
- To finalize the NIP, taking account of stakeholder input;
- To secure political support and endorsement by the relevant authorities for the NIP and its implementation;
- To transmit an agreed revised and updated NIP to the Conference of the Parties (COP) of the Convention;
- To establish and put into practice a mechanism for periodic updating and review of the NIP in accordance with Article 7 of the Convention;
- To establish a mechanism for reporting to the COP as required;
- To put in place the mechanism for implementation of the NIP.

1.3.4 National Implementation Plans and Socio-Economic Assessments

A socio-economic assessment (SEA) provides information on the social, cultural, economic and political conditions of individuals, households, groups, communities and organizations. In the context of POPs, POPs-like chemicals and other toxic chemicals, it is an assessment of the potential social impacts that management of these substances may have on all sectors of society. A SEA allows for the analysis and management of both positive and negative social impacts of the interventions undertaken (policies, programmes, plans and projects) and any social change processes invoked by those interventions.

Annex F- Information on Socio-economic Considerations of the SC, provides an indicative list of items to be taken into consideration by Parties when undertaking an evaluation regarding possible control measures for chemicals being considered for inclusion into the Convention. For this purpose, relevant information should be provided relating to socio-economic considerations associated with possible control measures to enable a decision to be taken by the Conference of the Parties.

After assessing the potential impacts, a SEA is conducted in order to assist with choosing actions that are appropriate and correctly focused as well as monitoring their effectiveness. The SEA provides a basis for

minimising the negative impact on populations and also for improving equitable outcomes for the most vulnerable groups.

In the context of managing POPs, social and economic impacts might include:

- vulnerability arising from exposure to POPs;
- deterioration or improvement in health;
- loss or improvement in livelihoods;
- changes in cost of living;
- changes in employment, income and workplace protection;
- levels of child labour;
- changes in levels of equity of wealth distribution;
- opportunities for enterprise development (including Small and Medium Enterprises); and
- changes in demand for public services, such as health, education, and infrastructure.

When updating the NIP, the following considerations need to be addressed:

(i) Impact on people as well as the environment

The SEA ensures that the management of POPs takes into account the impact of proposed management strategies on the well-being of all sectors of a community, particularly the most vulnerable. The data generated by the assessment will inform the NIP and implementation teams, enabling them to analyse, monitor and manage the social consequences of actions on POPs.

(ii) Obligations under the Stockholm Convention

Throughout the text of the SC, references were made to socio-economic assessments. These references indicate the importance of a SEA when implementing the obligations under the Convention and when developing the updated NIP. Furthermore, the GEF 2020 long-term strategy suggests aligning global environmental objectives with national and global socio-economic development priorities. This can be considered, where appropriate, also on national scale. A SEA was not conducted for this NIP update but can be considered as an activity for the future.

1.3.5 Gender Policy in the NIP Development and Implementation

Gender consideration is an important aspect to consider when planning, since it is a key variable in development. Thus, there were efforts to integrate an explicit gender dimension into the SC. The management of chemicals, including POPs has important gender dimensions, since in daily life, men, women and children are exposed to different kinds of chemicals in varying concentrations.

There are different biological factors, notably size and physiological differences across sex and age, that influence susceptibility to health damage from exposure to toxic chemicals. In addition to social factors, primarily gender-determined occupational roles also have an impact on the level and frequency of exposure to toxic chemicals, the kinds of chemicals encountered and the resulting impacts on human health.

It is therefore of utmost importance that these gender dimensions are evident in every aspect and at every level of the interventions for sound chemicals management. The gender analysis is used to identify, understand and describe gender differences and the impact of gender inequalities in a sector or programme at the country level. Gender analysis is a required element of strategic planning and is the basic foundation on which gender integration is built. Gender analysis examines the different but interdependent roles of men and women and the relations between the sexes. It also involves an examination of the rights and opportunities of men and women, power relations, and access to and control over resources. Gender analysis identifies disparities, investigates why such disparities exist, determines whether they are detrimental, and if so, looks at how they can be remedied (United States Agency for International Development (USAID), 2011).

In agreement with the GEF Policy on Gender Mainstreaming and the GEF-6 approach on gender mainstreaming, GEF projects funded under this strategy will not only acknowledge gender differences within their design but determine what actions are required to promote both women's and men's roles in chemical management, disproportionate chemical exposure and vulnerability, as well as sustainable alternatives. For the NIP update project, efforts were made to balance genders during consultation workshops for prioritizing POPs and Action Planning.

1.3.6 Limitations

The primary limitation encountered in the preparation of this NIP was a significant lack of data to describe certain aspects of the existing situation. This was addressed by recommending additional studies and assessments in the respective action plans to fill these data gaps. For the inventories conducted for this report, where information was not available, other data sources were used. This included industry and business reports.

2 COUNTRY BASELINE

2.1 Country Profile

This chapter provides summary information on the Republic of Trinidad and Tobago, highlighting economic and industrial activities that are relevant to Persistent Organic Pollutants.

2.1.1 Geography and Population

Location

Trinidad and Tobago is an archipelagic state situated at the southern limit of the West Indies, just 11 km from the coast of Venezuela at the nearest point (see Figures 1).



Figure 1: Trinidad and Tobago's location in the West Indies (source GORTT, 2013)

Climate

The country experiences two (2) seasons per year: a dry season, roughly between January and May, and a wet season, roughly from June to December. Winds are dominated by the Northeast Trades and blow predominantly from the east to the northeast.

Population

The published results of the Trinidad and Tobago Census for June 2017 (Central Statistical Office, 2017) indicate a total population of 1,356,633. The male population was 680,661 while the female population was 675,972. The dependency ratio was 41.95%.

2.1.2 Political and Economic Profile

Political Profile

The Republic of Trinidad and Tobago is a stable democracy, with elections scheduled at intervals not exceeding five (5) years. Transitions of power between different political parties have been achieved smoothly, with no threat of public uprising or military intervention. There have been only two (2) insurrections since independence in 1962: an army revolt in 1970 and an attempted coup in 1990.

Economic Profile

The Review of the Economy, 2017 (GORTT, 2017), issued by the Government of Trinidad and Tobago indicated that the Trinidad and Tobago economy registered a mild contraction in 2017, with negative growth shrinking to -2.3% from -6.0% in 2016. Lower economic activity was forecasted in ten (10) of the 20 industrial groupings for 2018, which together represent approximately 68.6% of Trinidad and Tobago's real gross domestic product (GDP). The remaining ten industrial groupings, which embody approximately 30.5% of the national economy, should achieve positive growth outcomes this calendar year. The energy sector accounts for around 34.9% of the country's GDP. The unemployment rate, as of March 2017, was reported at 4.5%.

2.1.3 Profile of Economic Sectors

Petroleum Industry

The petroleum industry in Trinidad and Tobago includes exploration, production and refining of crude oil and natural gas, both offshore and onshore. The Petroleum Sector produced an estimated 71,000 barrels of oil per day for 2016 (TT Energy Conference, 2017) which is a decline from 82,000 barrels of oil per day in 2012 and 3,300 MMSCF/day of natural gas which is a decline from 4,093 MMSCF/day of natural gas in 2011.

Power Generation

Power generation in Trinidad and Tobago is mainly from natural gas although there is capacity for one plant to run on diesel. There are five (5) power plants in Trinidad ranging in size from 225 MW to 838 MW, with a total capacity of 2,289 MW. The single power plant in Tobago has a capacity of 65.6 MW and can run on diesel as well as natural gas.

Other major Industries

Major industrial estates in Trinidad and Tobago are shown in Figure 2 below. The largest industrial sub-sectors are the following:

- Eleven (11) ammonia plants ranging in annual capacity from 250,000 tonnes to 650,000 tonnes; for a total annual capacity of 5.2 million tonnes (MEEI, 2017).
- Seven (7) methanol plants were in operation at the beginning of 2016, but this was reduced to five (5) plants when two (2) plants were shut down at the beginning of 2017.
- One (1) cement producer with an annual capacity of 780,000 tonnes. However, the demand for cement has dropped, and as a consequence, cement production fell by 13.0% to 557,600 metric tonnes, from 640,600 metric tonnes one (1) year earlier (GoRTT, 2017).
- One (1) Iron and Steel Mill, which produced approximately 1.6 million tonnes per year (GoRTT, 2017). The other company, Arcelor Mittal Point Lisas Limited ceased production of iron and steel products in Trinidad and Tobago in October 2015.

Solid Waste Disposal

- Municipal solid waste in Trinidad is disposed primarily at the Beetham, Guanapo and Forres Park landfills which are managed by SWMCOL. The disposal site in Tobago is the Studley Park Landfill, which has been managed by the Tobago House of Assembly since 1989 (see Figure 3 below). There is also a site at Guapo that is managed by the Point Fortin Borough Corporation. These sites all have ongoing challenges including indiscriminate fires that threaten the surrounding neighbourhoods and the general public.

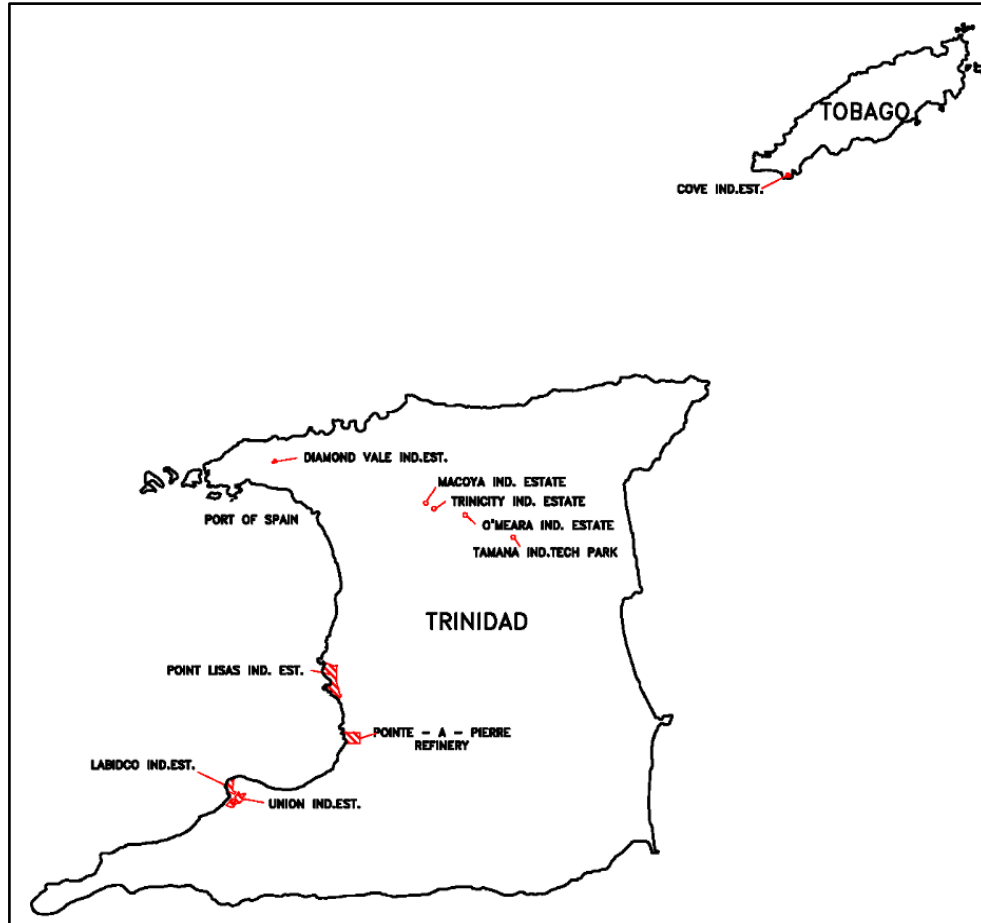


Figure 2: Major Industrial Estates in Trinidad and Tobago (source GORTT, 2013)

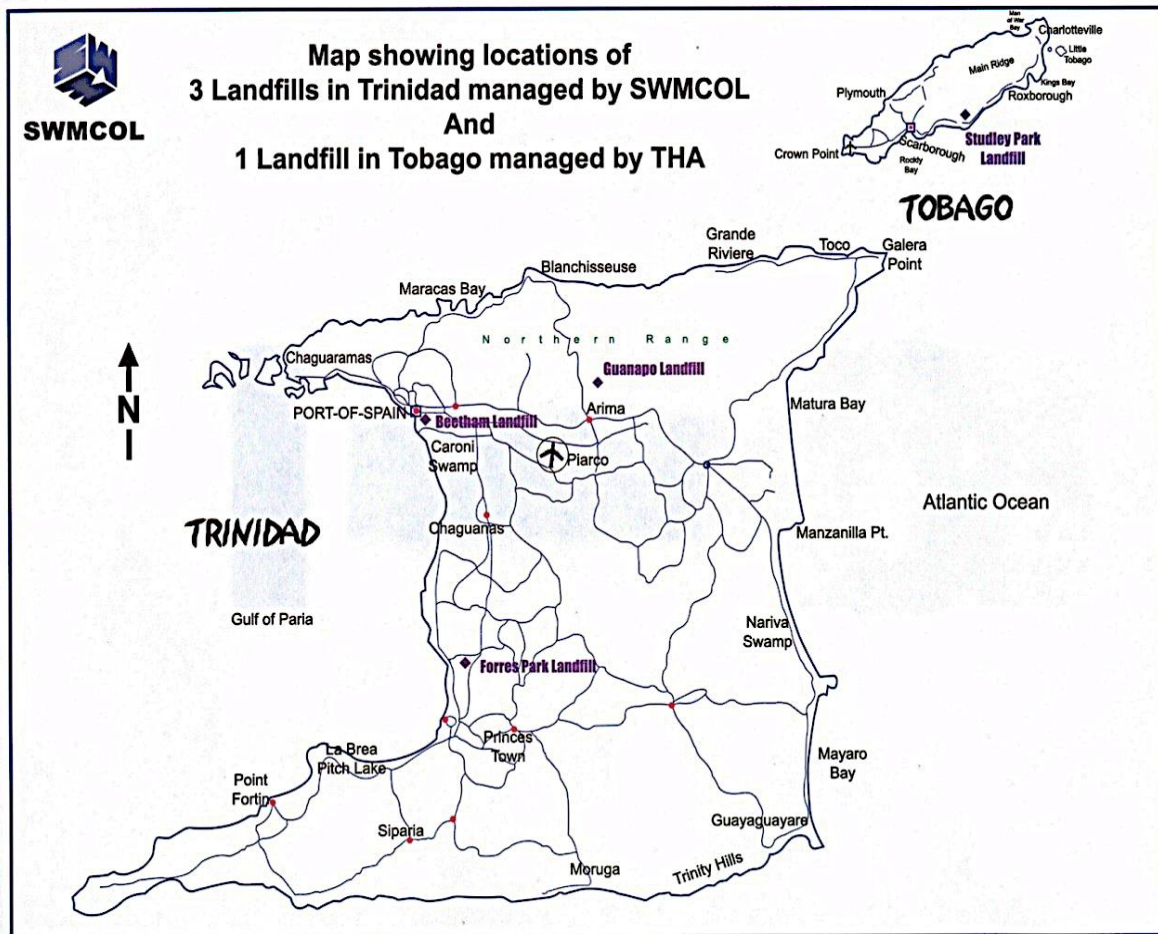


Figure 3: Landfill Sites in Trinidad and Tobago (source: SWMCOL)

2.1.4 Environmental Priorities

Through the consultation process for the updated National Environmental Policy (NEP) (2018), prepared by the Environmental Management Authority (EMA), six (6) environmental priorities were identified. These are:

- Protecting Environmental and Human Health through Pollution Control;
- Sustainably Managing Natural Assets;
- Improving the Local Environment;
- Evolving a Greener Economy;
- Fostering an Environmentally Responsible Society; and
- Addressing Climate Change and Disaster Risk Reduction.

These priorities are also aligned with the United Nations 2030 Sustainable Development Agenda.

2.2 Policy and Regulatory Framework

2.2.1 Policies and General Legislative Framework

This section introduces the country's National Environmental Policy (NEP) and laws that are relevant to the SC and POPs. There is also the Vision 2030 National Development Strategy which aims to provide a broad socio-economic development framework to the year 2030. It is intended to provide for an orderly long-term development process, inclusive of the United Nations (UN) Sustainable Development Goals (SDGs).

2.2.1.1 National Environmental Policy (NEP)

Trinidad and Tobago developed a NEP in 2006. The EMA has since revised the NEP which was approved by Parliament in 2018. References to the Stockholm Convention and POPs in the NEP (2018) are as follows:

- Section 2.02 on Air Pollution indicates that the Government will “*undertake proactive measures to address the sources and forms of air pollution within its national boundaries*” in alignment with the objectives of the Stockholm Convention and other relevant international treaties.
- Under Section 2.04 on Solid and Hazardous Wastes, the sub-section on Hazardous Substances and Waste indicates that “*the GoRTT will amend existing legislation or develop new legislation, as appropriate, to give effect to the enforcement of Multilateral Environmental Agreements on hazardous substances and hazardous waste including, but not limited to... the Stockholm Convention on Persistent Organic Pollutants*”.
- The Stockholm Convention on Persistent Organic Pollutants is listed in *Annex I: International Treaties and Conventions related to the Environment* as a treaty related to hazardous substances and spills.

The Environmental Policy also espouses several key principles in Section 1.05 including, inter alia:

- **Polluter Pays Principle:** the cost of preventing pollution or of minimising environmental damage due to pollution will be borne by those responsible for pollution.
- **Precautionary Principle:** if there are threats of serious irreversible environmental damage, lack of full scientific certainty will not be used as a reason for postponing measures to prevent environmental degradation.

2.2.2 Roles and Responsibilities of Governmental Entities

The following institutions are involved in the management of POPs life cycles, that is, from source to disposal, environmental fate and health monitoring:

- The Ministry with responsibility for the Environment;
- The Ministry of Energy and Energy Industries (MEEI);
- The Pesticides and Toxic Chemicals Control Board (PTCCB);
- The Ministry of Agriculture, Land and Fisheries (MALF);
- The Ministry of Trade and Industry (MTI);
- The Customs and Excise Division;
- The Environmental Management Authority (EMA);
- The Department of Environment (DOE), Division of Infrastructure, Quarries and the Environment (DIQE), Tobago House of Assembly;
- Municipal and Regional Corporations (under the Ministry of Rural Development and Local Government); and
- Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL).

2.2.2.1 The Ministry with Responsibility for the Environment

The Ministry with responsibility for the Environment has been designated as the:

- National Focal Point and the Official Contact Point under the Stockholm Convention;
- Focal Point under the Basel Convention; and
- Designated National Authority under the Rotterdam Convention.

Technical support for the Focal Point is provided by the Multilateral Environmental Agreements Unit (MEAU) of the Environmental Policy and Planning Division (EPPD), which currently falls under the Ministry of Planning and Development (MPD). The MEAU also undertakes the dissemination of information concerning the Conventions, including seminars and workshops.

2.2.2.2 The Ministry of Energy and Energy Industries

The Ministry of Energy and Energy Industries (MEEI) regulates the use of industrial chemicals in the Petroleum and Petrochemical Sectors through its Health, Safety and Environment (HSE) Department. The MEEI was instrumental in developing the Updated National Oil Spill Contingency Plan, 2013. This Plan was developed to specifically deal with oil spills. There is also a draft National Chemical Spill and Gaseous Releases Contingency Plan of Trinidad and Tobago, which was developed in 2013. It is still in draft form and needs to be reviewed and updated.

2.2.2.3 The Pesticides and Toxic Chemicals Control Board

The Pesticides and Toxic Chemicals Control Board (PTCCB), and the associated Inspectorate (PTCI), operate under the provisions of the Pesticides and Toxic Chemicals Act (Chap. 30:03) and Regulations made under that Act. The PTCCB is responsible for registering chemicals and pesticides that can be imported into Trinidad and Tobago. Registration of a particular chemical is not permanent. Registrations can be reviewed, based on local experience or based on international information. Based on such a review, chemicals previously registered can be de-registered.

2.2.2.4 The Ministry of Agriculture, Land and Fisheries

The Ministry of Agriculture, Land and Fisheries (MALF) is involved in the control of the importation of pesticides through the PTCCB. The Chief Technical Officer (CTO) of the MALF is, ex officio, the Deputy Chairman of the PTCCB. In addition, the MALF has one other member on the PTCCB. MALF representatives on the PTCCB play an active role on the Screening Committee on the importation of new chemicals. POPs are banned, so the Screening Committee would not allow their importation.

The CTO of the MALF is also delegated to grant duty-free concessions for agricultural chemicals (pesticides and fertilizers). Such concessions for pesticides would be granted based on recommendations from the Crop Protection sub-Division of the Research Division, on whether the pesticides are registered by the PTCCB and their proposed use. Fertilizers are also recommended by the Research Division to the CTO for duty free concessions based on use of the product in agriculture.

2.2.2.5 The Ministry of Trade and Industry

The Ministry of Trade and Industry (MTI) regulates the import and export of chemicals via the Negative List and a regime of import and export licenses. In general, licenses would not be issued for items on the Negative List. This includes both the regulated substance as well as any equipment containing that substance. Import licenses issued by the MTI are used by the Customs and Excise Division for clearing cargoes and are also examined by the Trinidad and Tobago Bureau of Standards (TTBS), the Chemistry, Food and Drugs Division (CFDD), and the Pesticides and Toxic Chemicals Inspectorate (PTCI).

2.2.2.6 The Customs and Excise Division, Ministry of Finance

The work of the Customs and Excise Division is guided by legislation, so the issue of POPs would be addressed by Customs only if regulations are put in place by a relevant Ministry. Two (2) main mechanisms are available to control the import of POPs: a licensing regime, or outright prohibition.

In either case, the necessary regulations would have to be put in place by the relevant Ministry before Customs could act on it. The Customs and Excise Division co-ordinates with other agencies concerning the importation of specific substances. For example, the MTI would issue import licenses, the PTCI would inspect certain items, and the TTBS and the CFDD would inspect others.

2.2.2.7 The Environmental Management Authority

The Environmental Management Authority (EMA) was created under the Environmental Management Act, 2000. The EMA presently regulates chemicals and waste via the following mechanisms:

- Designated Competent Authority under the Basel Convention;
- The Certificate of Environmental Clearance (CEC) Rules, 2001;
- The Water Pollution Rules, 2006; and
- The Air Pollution Rules, 2014.

The EMA will have a further role in the regulation of waste when the Waste Management legislation as per sections 55 to 58 of the Environmental Management Act is enacted.

2.2.2.8 The Department of Environment, Division of Infrastructure, Quarries and the Environment, Tobago House of Assembly

Matters pertaining to POPs and the Stockholm Convention are normally handled by the Director of the Department of Environment (DOE) of the Division of Infrastructure, Quarries and the Environment (DIQE) in the Tobago House of Assembly. There are no plans to develop procedures for the management of POPs specifically for Tobago. Instead, guidelines and procedures developed nationally would be used in Tobago.

Under a Memorandum of Understanding (MOU), specific roles and functions of the EMA are delegated to the DOE. Specifically, the DOE implements the CEC Process in Tobago. The EMA has an office in Tobago and this office provides oversight to the CEC process. The DOE also involves a large number of agencies of the Tobago House of Assembly (THA) and other stakeholders in the Certificate of Environmental Clearance (CEC)/Environmental Impact Assessment (EIA) Process.

The DOE is represented on the Multilateral Environmental Agreements Committee of the MPD.

2.2.2.9 Management Agencies for Solid Waste

The Municipal and Regional Corporations (under the Ministry of Rural Development and Local Government) are involved in the collection of solid waste throughout the country. SWMCOL operates three (3) of the country's landfills (see Section 2.1.3.4). These organizations are not directly involved in the management of POPs, but they have an indirect role since the landfills have been identified as potential sources of UPOPs.

2.2.2.10 Summary of Roles and Responsibilities

Table 2 below summarises the roles and responsibilities of the various agencies, ministries and institutions involved in chemicals and waste management.

Table 2 Summary of roles and responsibilities of institutions involved in chemical and waste management

INSTITUTIONS	ROLES AND RESPONSIBILITIES
Ministry with responsibility for the Environment	Designated as National Focal Point and the Official Contact Point under the Stockholm Convention, a Focal Point under the Basel Convention, and a Designated National Authority under the Rotterdam Convention.
MEEI	Regulates the use of industrial chemicals in the Petroleum and Petrochemical Sectors through its Health Safety and Environment Department and has prepared the draft Chemical Management Plan for the Energy Sector.
PTCCB	Responsible for registering chemicals and pesticides that can be imported into Trinidad and Tobago.
MTI	Regulates the import and export of chemicals via the Negative List and a regime of import and export licenses.
MALF	Involved in the control of the importation of pesticides through membership in the PTCCB and also grants duty-free concessions for agricultural chemicals (pesticides and fertilizers) and incentives for the use of environmentally friendly pesticides.
Customs and Excise Division	Co-ordinates with other agencies concerning the importation of specific substances; particularly via the Negative List.
EMA	Responsible for developing and establishing national environmental standards and criteria and monitoring compliance with those standards and criteria.
SWMCOL	Responsible for the management and operation of the three major landfill or disposal sites in the country, Beetham, Forres Park and Guanapo. Also responsible for coordinating the collection of waste tyres and beverage containers for further treatment or disposal (curb-side collection campaign with some municipal and regional corporations).
DOE, DIQE, Tobago House of Assembly	Represented on the Multilateral Environmental Agreements Committee of the Ministry of Planning and Development and undertakes specific roles and functions of the EMA in Tobago under a Memorandum of Understanding.

2.2.3 Relevant International Commitment and Obligations

In addition to the Stockholm Convention on Persistent Organic Pollutants, Trinidad and Tobago is signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals in International Trade. These three (3) conventions, together with other multilateral environmental agreements such as the Montreal Protocol and Minamata Convention, provide an international framework governing the environmentally sound management of hazardous chemicals throughout their lifecycles. The Stockholm Convention was introduced in Section 1.2, and the following

sections describe the Basel and Rotterdam Conventions, as per excerpts from the previous NIP (GORTT, 2013) as well as the Minamata Convention and Montreal Protocol.

2.2.3.1 The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (the Basel Convention) was adopted in 1989 in Basel, Switzerland, in response to concerns about toxic waste from industrialized countries being dumped in developing countries. The objective of the Convention is to protect human health and the environment from the harmful effects of hazardous waste. The scope covers a long list of wastes defined as “hazardous wastes” based on their origin, composition and characteristics, as well as “other wastes” - defined here to mean household waste and incinerator ash.

The initial provisions of the Convention centred around the reduction of hazardous waste generation and the promotion of Environmentally Sound Management (ESM) of hazardous wastes. However, since its ratification, the Convention has seen several changes including the addition of the “Ban Amendment” (1995) which provides for the prohibition by each Party included in the proposed new Annex VII (Parties and other States which are members of the Organisation for Economic Co-operation and Development (OECD), European Commission, Liechtenstein) of all transboundary movements to States not included in Annex VII of hazardous wastes covered by the Convention that are intended for final disposal, and of all transboundary movements to States not included in Annex VII of hazardous wastes covered by paragraph 1 (a) of Article 1 of the Convention that are destined for reuse, recycling or recovery operations.

Trinidad and Tobago acceded to the Basel Convention in 1994. Obligations under the Convention include, *inter alia*:

- The development of a National Policy to address the issues of hazardous waste and other wastes and their disposal, including national objectives to minimize the generation of hazardous waste taking into account social, technical and economic considerations.
- Formulation of Legislation to address the formal definition of relevant terms including “hazardous waste”, “transboundary movement”, and “proper disposal”.
- Formulation of guidelines to deal with the storage, transportation and disposal of hazardous and other wastes.
- Submission to the Convention Secretariat on the status of actions taken.

Trinidad and Tobago serves as the host country for the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC-Caribbean). This Centre, an independent organisation since 2004, was established under a Framework Agreement signed between the Government of the Republic of Trinidad and Tobago (GORTT) and the Secretariat of the Basel Convention as well as by Act Number 2 of the Laws of the Republic of Trinidad and Tobago. The Centre serves fourteen (14) Parties to the Convention throughout the Caribbean region and has been active in providing training, information and technical support in aspects related to the implementation of the Basel Convention.

2.2.3.2 The Rotterdam Convention

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. The Convention emerged out of concern for the harmful impact on human health and the environment from the trade of certain hazardous chemicals and pesticides, as reflected in the Rio Declaration on Environment and Development and Chapter 19 of Agenda 21 on “Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products”.

The Convention replaced the voluntary Prior Informed Consent (PIC) standards set out by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organisation (FAO) in the

International Code of Conduct and the UNEP Code of Ethics on the International Trade in Chemicals, with a mandatory PIC procedure. The objective of the Convention is to “promote shared responsibility and cooperative efforts among Parties in the international trade of hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties”.

In this context, the Rotterdam Convention is primarily about facilitating information exchange as a first line of defence against hazardous chemicals. Further, the PIC procedure enables countries to monitor and control the trade in the chemicals mentioned in the Convention; it is not a recommendation to ban the global trade or use of these chemicals. Rather, it gives importing countries the power to make informed decisions as to which of these chemicals they want to receive and those they wish to exclude due to limitations in domestic capacity to safely manage them. Additionally, obligations for proper labelling and provision of information on potential health and environmental effects related to the specific chemicals being traded provides increased opportunities for the promotion of the safe use and disposal of these chemicals.

2.2.3.3 The Minamata Convention on Mercury

The Minamata Convention on Mercury was adopted in October 2013 at a Diplomatic Conference (Conference of Plenipotentiaries), held in Kumamoto, Japan. It is a global treaty to protect human health and the environment from the adverse effects of mercury. Trinidad and Tobago is actively considering becoming a Party to the Minamata Convention, which entered into force in August 2017.

2.2.3.4 The Montreal Protocol

In 1987, world governments established the United Nations Montreal Protocol on Substances that Deplete the Ozone Layer. The Protocol aims to eliminate the use of ozone depleting substances (ODS) to ensure the protection of the ozone layer. Trinidad and Tobago signed the Montreal Protocol in August 1989 and has since ratified its Amendments.

2.2.3.5 Existing Legislation and Regulation Addressing POPs (manufactured chemicals and unintentionally produced POPs)

As noted previously, there is currently no enabling legislation for the Stockholm Convention in Trinidad and Tobago. The following existing laws and regulations relevant to the management of POPs, are briefly described below:

- Pesticides and Toxic Chemicals Act and Regulations;
- The EMA's Certificate of Environmental Clearance Rules;
- The EMA's Water Pollution Rules;
- The EMA's Air Pollution Rules;
- National Solid Waste Policy and Strategic Plan;
- The EMA's Draft Waste Management Rules, 2018; and
- The Import Negative List (Legal Notice No 89 / Notice to Importers No. 1 of 1999).

2.2.3.6 Pesticides and Toxic Chemicals Act and Regulations

The Pesticides and Toxic Chemicals Act (Chap 30:03) defines a “controlled product” as any pesticide or toxic chemical. POPs would be classified as pesticides or toxic chemicals, so they are regulated under this law.

a) Pesticides Regulations

The Pesticides Regulations under this Act require the registration of pesticides. When an application for registration is made, the PTCCB may refuse for a number of reasons, including:

- The pesticide has not been shown to be safe or efficacious when used as recommended.
- The use of the pesticide is likely to constitute a hazard to public health, domestic animals, bees, fishes, birds or other wildlife or produce adverse effects to soil, air and water.
- The pesticide, or any residue thereof, is so persistent that it may result in long-lasting pollution of the water or land on which it is used.

The PTCCB is required to advertise all applications for registration of a pesticide, and any person may object to the registration of a pesticide on any of the grounds listed in the Regulations. Under these clauses, any person may object to the registration of any of the POPs which are pesticides.

b) Toxic Chemicals Regulations

The Toxic Chemicals Regulations under this Act require the registration of toxic chemicals. The PTCCB's reasons to refuse to register a toxic chemical are the same as stated for pesticides (Section 2.2.4.1a). Unlike the Pesticides Regulations, the Toxic Chemicals Regulations do not require advertisement of applications for registration. Instead, Clause 2 states that "every application shall be treated as confidential by the Board".

2.2.3.7 EMA - Certificate of Environmental Clearance (CEC) Rules

The Certificate of Environmental Clearance Rules, 2001 is a piece of legislation generated from the Environmental Management Act Chapter 35:05. The 'Rules' guides the assessment of small and large-scale developmental projects which may have both positive and negative environmental effects.

The Certificate of Environmental Clearance (Designated Activities) Order, 2001, as amended, defines the forty-four (44) activities which require a CEC. During the assessment of these applications, the EMA takes into consideration foreseeable impacts which may arise out of any new or significantly modified construction, process, works or other activity as outlined by the Order.

At the preliminary phase of the assessment of the proposed project, if potential significant environmental and human health impacts have been identified, the applicant may be asked to conduct an Environmental Impact Assessment (EIA).

2.2.3.8 EMA - Water Pollution Rules

The EMA's Water Pollution Rules (2001, as amended) regulate wastewater discharges from industrial facilities, commercial facilities, agricultural facilities, institutions and sewerage facilities. The First Schedule of the Rules lists a number of parameters or substances and the concentrations at which they would be considered to be "pollutants". All facilities which discharge any "pollutant" must apply.

2.2.3.9 EMA's Air Pollution Rules

The Air Pollution Rules, 2014 became law on January 23rd, 2015. A Source Emitter refers to any facility from which an air pollutant or pollutants are presently released into the atmosphere. It also includes proposed facilities which, in the near future, will release pollutants into the atmosphere.

In defining an air pollutant, it can be described as certain substances released into the atmosphere above a specific quantity, concentration or level, or which has an impact on the atmosphere. In Schedules 1 and 2 of the Air Pollution Rules, 2014, the maximum allowed levels of emissions of air pollutants are listed. Dioxins and Furans are included in both Schedules, but UPOPs are not specifically included.

2.2.3.10 National Solid Waste Policy and Strategic Plan

The Ministry of Local Government issued a National Solid Waste Policy in 2013 and recently completed a Strategic Plan. The primary focus of these documents will be the rationalization of solid waste management (collection and disposal) in the country. They will not focus directly on POPs or UPOPs, but the rationalized management approach is likely to reduce the potential for the generation of UPOPs at the disposal sites.

2.2.3.11 Draft Waste Management Rules

The EMA has reviewed previous iterations of draft waste management legislation, the most recent being the draft Waste Management (Hazardous Waste) Rules, 2014 and the draft Solid Waste (Non-Hazardous) Management Rules, 2014, to prepare new legislation in furtherance of Sections 55 to 58 of the Environmental Management Act. The new draft legislation, currently referred to as the “Draft Waste Management (Registration and Permitting) Rules, 2018” proposes a regulatory regime which will consist of a registration and permitting processes. Persons who generate wastes above specific quantities will be required to obtain a registration certificate and waste handlers (persons who receive waste for transport, treatment, recovery, recycling and disposal) will be required to obtain a permit. The new draft legislation will be presented to the public under the Public Comment Procedure of the Environmental Management Act in due course.

2.2.3.12 Import Negative List

The Negative List is a system of import and export controls operated by the Ministry of Trade, Industry and Investment. The Import Negative List (Legal Notice No 89 / Notice to Importers No. 1 of 1999) already contains a number of POPs: DDT, Aldrin, Dieldrin, Endrin and Pentachlorophenol. Import licenses would not be issued for items on the Negative List; including both the regulated substance as well as any equipment containing that substance. The Negative List system has been generally acknowledged as an excellent example of effective co-ordination between Government Agencies.

2.2.4 Key Approaches and Procedures

The following sub-sections describe enforcement and monitoring, industry practices and training.

2.2.4.1 Enforcement and Monitoring

Enforcement of the requirements of the Stockholm Convention will be undertaken by the relevant Government Agencies in accordance with the Local Enabling Legislation (to be enacted) and the other laws and regulations.

Legal action against violators will require laboratories to test samples and verify the presence of POPs. Trinidad and Tobago is served by several laboratories (local and foreign with local agents) that can test for some POPs, as listed in Table 3. The laboratories of CARIRI are certified as meeting the requirements of ISO 9001:2008 for consulting, industrial research and testing, and equipment design and development. They are also compliant with the ANSI/ISO/IEC 17025:2005 standard and general criteria for the competence of testing and calibration laboratories and have been accredited by the International Accreditation Service Inc. for the test methods listed in the scope of accreditation at IASonline.org.

Chemistry Food and Drugs Division (CFDD) offers a broad range of laboratory services including analysis of pesticides and toxic chemicals for compliance with the Pesticides and Toxic Chemicals Act and Regulations, and analytical and advisory support to the Customs and Excise Division. The laboratory has been non-functional for several years but was expected to be back in operation during the latter half of 2018. However, as of March 2019, the laboratory was still out of operation.

Private laboratories have also indicated a capability to test for POPs. The laboratory capabilities have remained the same since the last NIP for both the government as well as the private laboratories.

Table 3: Local laboratory capacity for testing POPs

PERSISTENT ORGANIC POLLUTANTS	Environmental Lab at the CFDD	CARIRI	Private Sector Labs
Aldrin	✓	✓	✓
Chlordane	✓		✓
DDT	✓	✓	✓
Dieldrin	✓	✓	✓
Endrin	✓	✓	✓
Heptachlor	✓	✓	✓
Hexachlorobenzene	✓		✓
Mirex	✓		✓
Toxaphene	✓		✓
PCBs	✓		✓
Chlordecone			✓
Lindane		✓	✓
Pentachlorobenzene			✓
Technical Endosulfan and its isomers			✓
Alpha Hexachlorocyclohexane	✓		
Alpha Hexachlorocyclohexane	✓		

✓ Indicates testing capability

2.2.4.2 Industry Practices

Trinidad and Tobago is the largest oil and natural gas producer in the Caribbean. The local petrochemicals industry includes exploration and refining of crude oil and natural gas, both offshore and onshore. There are a number of medium and small industries that support the oil and gas sector. Trinidad and Tobago is also the largest exporter of ammonia and the second largest exporter of methanol worldwide; hence, the country is a major player in the global chemicals market (BCRC-Caribbean, 2015). Additionally, the country has manufacturing and services sectors that are dominated by medium and small industries. A summary of general industrial practices is given below:

a) Health and Safety Personnel

The majority of organisations have Health and Safety Managers supported by officers. For the most part, the Health and Safety Managers report to the head of the company (President, Chief Executive Officer or Managing Director).

b) Use of Industrial Chemicals

The majority of large companies have formal procedures for selecting new chemicals (Management of Change Systems, Hazardous Material Policies, Chemical Safety Programme, etc.). Small and medium sized companies tend to rely on manufacturer's recommendations and recommendations from suppliers. A few companies use Hazcom Programmes or Risk Assessments in planning for the safe handling of

chemicals. The majority reported using other methods, mainly information from the Material Safety Data Sheets (MSDS).

c) Training of Workers

Many companies provide training in Hazardous Waste Operations and Emergency Response (HAZWOPER) and Hazardous Materials (HazMat), depending on the nature of the operations. Some medium and small industries provide training in chemical safety and spill response. Many industries train their workers in the use of MSDS.

d) Emergency Response

All industries have an in-house emergency response capability. If the emergency exceeds their in-house facilities, industries indicated that they could call on the fire service, the Trinidad and Tobago Emergency Mutual Aid Scheme (TTEMAS) or private contractors.

e) Waste Disposal

All industries use private waste disposal companies to treat and dispose of at least some of their waste. Many use a manifest system to track the waste until final disposal.

2.2.4.3 Training

Training on handling, storage and use of industrial chemicals is available at two (2) levels: University Degrees and Short Courses.

a) University Degrees

Tertiary level institutions in Trinidad and Tobago offer training related to chemical management, environmental management and engineering with regards to Occupational and Environmental Safety and Health (OESH) up to Bachelor's and Master's Degree levels. Some of the competency outcomes and goals of these programmes include:

- Recognition of OESH challenges;
- Evaluation of OESH challenges;
- Management and control of OESH challenges;
- Development, design, implementation and management of complex OESH programmes;
- Provision of high-level leadership in research and policy-making;
- Certification in Safety Engineering in the Industrial Environment; and
- Trained professionals who will be able to inspect, audit, analyse and advise management on how to develop and maintain a safety culture.

b) Short Courses

There are several private institutions that provide short courses and training in the following areas related to chemical and waste management:

- Accident Investigation;
- Risk Assessment;
- HAZWOPER;
- Pipeline Hazardous Materials Response;
- Hazardous Transportation;
- Basic Chemical Safety;
- Transport of Hazardous Material;
- Annual certification and re-training programmes for asbestos workers, supervisors and inspectors;

- HazMat Technician Training;
- Medic First Aid Training;
- OSHA Training;
- Industrial Firefighting;
- Chemical Safety/MSDS/Hazcom;
- Basic Safety Training;
- Job Safety Analysis;
- Hazard Communication;
- Handling Hazardous Materials;
- Incident /Accident Reporting, Investigation and Root Cause Analysis;
- Safety Auditing Procedures and Practices;
- Emergency Response;
- Environmental Compliance;
- Environmental Awareness;
- Incident Command System;
- Industrial Firefighting; and
- Material Handling and Storage.

2.3 Assessment of POPs in Trinidad and Tobago

This section provides information on the present status of POPs in Trinidad and Tobago. Inventories were conducted for five (5) groups of POPs for 2016. The following sections detail the results of the inventories and other findings.

Overall, the results indicate that Trinidad and Tobago needs to put measures in place to reduce UOPs, as these are the only POPs produced in the country. Pesticides are well controlled by the PTCI. The other POPs are mostly found in older consumer products and waste articles and require some more attention with respect to their management and final disposal.

Potentially POPs contaminated sites and their associated environmental and health effects are the common concerns across all POPs and as such require special attention. There are many overlapping sites, so these should be addressed for all POPs.

2.3.1 Assessment of POPs Pesticides (Annex A, Part I)

Annex A, Part I, of the SC lists POPs Pesticides to be eliminated. None of these pesticides have ever been produced in Trinidad and Tobago, but some have been used in the past.

According to the Pesticides Inventory Report, 2016, POPs pesticides are presently regulated by the PTCCB, under the Pesticides Act. In addition, Aldrin, Dieldrin and Endrin are regulated under the Import Negative List (BCRC-Caribbean, 2017a). The POPs Inventory Report summarized the status of registration and use of these chemicals in Trinidad and Tobago as shown in Table 4. It should be noted that Trinidad and Tobago did not apply for an exemption for the use of Mirex-S.

Table 4: Status of the use of POPs pesticides in Trinidad and Tobago

	List of Persistent Organic Pollutants (POPS)	Currently Used or Found in Trinidad and Tobago	Status of Previous Use	Regulatory Controls
1	Aldrin	NO	Prior to 1989	Deregistered in 1990
2	Chlordane	NO	Prior to 1989	Deregistered in 1989
3	Dieldrin	NO	Prior to 1990	Deregistered in 1990
4	Endrin	NO	Prior to 1990	Deregistered in 1990
5	Heptachlor	NO	Never registered	N/A ²
6	Hexachlorobenzene (HCB)	NO	Never registered	N/A
7	Mirex	NO	Prior to 1991	Deregistered in 1991
8	Toxaphene	NO	Never registered	N/A
9	Dichlorodiphenyltrichloroethane (DDT)	NO	Prior to 1990	Deregistered in 1990
10	Alpha hexachlorocyclohexane	NO	Never registered	N/A
11	Beta hexachlorocyclohexane	NO	Never registered	N/A
12	Chlordecone	NO	Never registered	N/A

²N/A indicates that this is not applicable

	List of Persistent Organic Pollutants (POPS)	Currently Used or Found in Trinidad and Tobago	Status of Previous Use	Regulatory Controls
13	Hexabromobiphenyl (HBB)	NO	Never registered	N/A
14	Pentachlorobenzene (PeCB)	NO	Prior to 2000	Deregistered in 2000
15	Perfluorooctane (PFOS), its salts and PFOS-F	Mirex-S (Sulfuramide) Leaf Cutting Ant Bait (Not imported for the last three years)	Current	Exemption under the Stockholm Convention
16	Technical Endosulfan and its related isomers	No	Used up to 2001	On the Banned List of Pesticides
17	Pentachlorophenol (PCP), its salts and esters	Yes	N/A	On the banned list

No country-specific monitoring data for POPs pesticides in food or human tissue appears to be available, nor have the human health effects of POPs pesticides been studied in Trinidad and Tobago.

2.3.2 Assessment of Polychlorinated Biphenyls (PCBs) (Annex A, Part II) and Polychlorinated Naphthalenes PCNs (Annex A, Part I)

Annex A, Part II, of the SC lists POPs Industrial Chemicals to be eliminated. Polychlorinated biphenyls (PCBs) or PCB containing equipment were discontinued by Trinidad and Tobago in the 1980s. However, there is the possibility that PCB transformers older than 33 years may still exist, either in service and approaching their end of life, or decommissioned and in storage (BCRC-Caribbean, 2017b). Furthermore, transformers can become contaminated during maintenance if proper precautionary measures are not taken to avoid co-mingling with PCB contaminated equipment and/ or oil. Therefore, transformers newer than those installed in the 1980s can become contaminated with PCBs during service maintenance, and as such, a PCB inventory of transformers and capacitors and other equipment in operation is still needed. Such an assessment is planned within the regional GEF 5558 project, “Component IV: Managing and Disposing of PCBs.

Along with this assessment, remaining polychlorinated naphthalenes (PCNs) possibly present would also need to be analysed, since PCNs have been used for the same purposes as PCBs, in much lower total volumes and largely during the 1930s to 1960s (UNEP, 2017c).

Under the GEF 5558 project, the BCRC-Caribbean conducted a Rapid Assessment and Inventory of stored PCB oil and PCB contaminated equipment for disposal in Trinidad and Tobago in 2016 (BCRC-Caribbean, 2017b). The results of the rapid assessment found that in Trinidad and Tobago, there was one (1) transformer found, of the equipment sampled, to be contaminated with PCBs (>40 mg/kg) at a concentration of 570 mg/kg.

There were nineteen (19) pieces of equipment containing residual-PCBs (> 2 mg/kg but less than 40 mg/kg), stored at various sites. These included fourteen (14) at Trinidad and Tobago Electricity Company (T&TEC) storage yards, three (3) at the Petroleum Company of Trinidad and Tobago Limited (Petrotrin) and two (2) at PCS Nitrogen. This equipment consisted of eleven (11) transformers, four (4) 55-gallon drums, two (2) tanks and two (2) sumps. All equipment recorded relatively low PCB concentrations, ranging between 3-15 mg/kg with the exception of two (2) pole-mounted transformers located at T&TEC Distribution East (Arima) and Wrightson Road (18 mg/kg and 28 mg/kg, respectively). The average PCB concentration of residual PCB containing equipment in Trinidad and Tobago was 8 mg/kg.

Moreover, seventeen (17) pieces of equipment were suspected of containing PCBs. At Caroni 1975 Ltd, fifteen (15) transformers were suspected to be contaminated with PCBs, thirteen (13) at the Brechin Castle Factory and two (2) at the Usine Ste. Madeline Factory. The other two (2) transformers were located at the PowerGen facility in Port of Spain, which is earmarked for decommission. The transformers were not sampled for analysis due to time and safety constraints, however, according to the nameplates on the equipment, they contain the PCB oil by the trade name, PYRANOL.

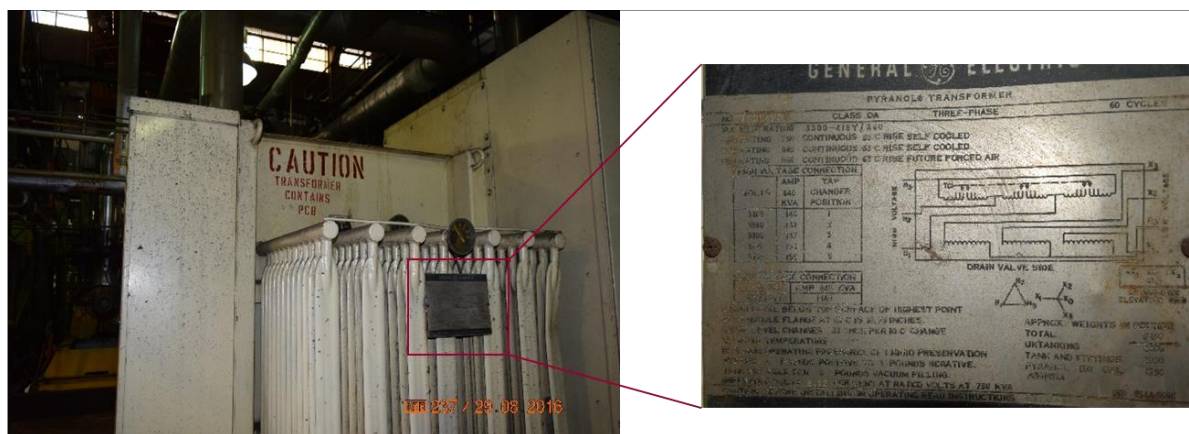


Figure 4: A transformer found to contain PCB oil, labelled as a PYRANOL Transformer. (Source: BCRC-Caribbean)

Trinidad and Tobago has not set a country-specific date for the phasing out of PCBs, so it is governed by the general phasing-out goals under the Convention:

- 2025 for phasing out the use of equipment containing PCBs (e.g. transformers, capacitors or other receptacles containing liquid stocks); and
- Environmentally sound waste management of liquids and equipment containing PCBs by 2028.

PCBs in open applications (sealants, coatings, paints) have not yet been assessed. In these applications, PCNs have also been used in the past (UNEP, 2017c). As such, an assessment of PCNs should be done along with the assessment of short chain chlorinated paraffins (SCCPs), as both have been recently listed as POPs in 2015 and 2017, respectively, and have been and are still used in such open applications.

2.3.3 Assessment of Polybrominated Diphenyl Ethers (POP-PBDEs) (Annex A, Part IV and V), Hexabromobiphenyl (HBB) (Annex A, Part I) and Hexabromocyclododecane (HBCD) (Annex A, Part I and Part VII)

An inventory was conducted in Trinidad and Tobago of the major stocks and waste consumer articles impacted with POP-PBDEs, Hexabromobiphenyl (HBB) and Hexabromocyclododecane (HBCD) for the

year 2016 (BCRC-Caribbean, 2017c). The respective Stockholm Convention inventory guidance documents were used for developing the inventory (UNEP 2017d, e).

PBDEs are a group of industrial aromatic organobromine chemicals, commonly referred to as brominated flame-retardants in a wide range of consumer products, that have been in use since the 1970s. POP-PBDEs are listed under Annex A of the SC; which prohibits its production and use, and its import and export, but allows the utilisation of articles in accordance with the provisions of Annex A, Parts IV and V (UNEP, 2017b). Three (3) commercial PBDE mixtures were produced and used on the market: commercial PentaBDE, OctaBDE and DecaBDE.

Commercial Penta-BDE (c-PentaBDE), (containing the homologues tetrabromodiphenyl ether and pentabromodiphenyl ether) as well as c-OctaBDE (containing hexabromodiphenyl ether and heptabromodiphenyl ether) are listed under the Stockholm Convention. TetraBDE, pentaBDE, hexaBDE and heptaBDE are listed in Annex A of the Convention, and their production and use have to be eliminated by Parties where the amendment has entered into force subject to the exemptions allowed by the Convention.

Hexabromobiphenyl (HBB) is listed in Annex A of the Convention but has only been produced in the 1970s at low volumes; so, it is considered that products containing HBB have already been disposed. There is no specific exemption for its production or uses.

Hexabromocyclododecane (HBCD) is another prominent brominated flame retardant, listed in Annex A to the Convention with specific exemptions for its production and use in expanded polystyrene and extruded polystyrene in building insulation.

As of May 2017, DecaBDE was also added to this POPs list with a range of exemptions for further use. It is to be noted that DecaBDE has not been addressed in this inventory and NIP update, as its inclusion in the SC occurred after the inventory year of 2016.

For POP-PBDEs, this inventory focused mainly on waste electrical and electronic equipment (WEEE) and the transportation sector. The evaluation of available and relevant national data was carried out using the tiered approach provided by the PBDEs inventory guidance document (UNEP, 2017d). A preliminary assessment of HBCD was also conducted considering the HBCD inventory guidance (UNEP, 2017e).

The WEEE inventory section focused on casings from cathode ray tubes (CRTs) that were used for the monitors of television sets and computers. Import data was available for the period 2007-2014 from the International Trade Centre (2015). More recently, devices with CRTs have mostly been replaced by flat screen monitors. However, it was assumed that CRTs imported from 2007 to 2014 were still in stock as Trinidad and Tobago does not have a national electronic waste (e-waste) management system. It was also assumed that some households still have their older television sets with the CRT monitors. However, this information was not attainable. Therefore, calculations using penetration rates for Latin America and the Caribbean were used (Table 5 below). This inventory did not consider the amount that would have been disposed of at the local landfill sites as this information was not yet available.

Table 5: Estimated total weight of c-OctaBDE, heptaBDE and hexaBDE for CRTs in households in Trinidad and Tobago

Year	Weight of CRTs (t)	Polymer Content (30% of weight, t)	c-OctaBDE range (kg) (0.87 - 2.54 kg/t)	HeptaBDE range (kg) (43% of c-OctaBDE)	HexaBDE range (kg) (11% of c-OctaBDE)
2016	12,320	3,696	3,213 - 9,388	1,382 - 4,037	353 - 1,033

Although information on CRTs disposed of at local landfill sites was not available, it was found that most of the WEEE generated in Trinidad and Tobago are disposed of at the local landfill sites. There are two (2) major recyclers of personal computers (PCs) in Trinidad and Tobago, and they charge a fee for the collection and recycling of the e-waste that they process. Both companies export processed items to external markets. One of the companies estimated that it processes less than 10% of PCs and other WEEE generated by the country (Garraway and Ott, 2010).

For the transportation sector, the guidance document noted that vehicles manufactured for the period 1975-2004 would potentially contain POP-PBDEs (UNEP, 2017d). Estimates of vehicles from 1985 to 2010 were calculated. The inventory period commenced at 1985 rather than 1975 (which was suggested by the Guidance Document) because studies from Basel Convention Coordination Centre (BCCC)-Africa indicate that the average time of vehicles in use and stockpiled for reuse or recycling was estimated to be 30 years (BCCC-Africa, 2012). Therefore, vehicles imported between 1985 and 2004 were considered to be in stock in Trinidad and Tobago. To calculate the amount of PBDEs in the vehicles for 1985-2010, the regional Impact Factor of 0.05 was used, as the majority of vehicles were imported from Japan. A small percentage would have been imported from the European Union (EU) where the factor is the same (UNEP, 2017d).

C-PentaBDE accounts for a major fraction of polyurethane (PUR) foam used in the transportation sector (seats, head and arm rests); it has been applied to 0.5% - 1% by weight. Considering an average use of 1% c-PentaBDE by weight in PUR foam in transport, the following estimates can be made:

- **Cars:** POP-PBDEs treated cars with approximately 16 kg of PUR foam contain approximately 160 g c-PentaBDE;
- **Trucks:** The amount of PUR foam is estimated to be similar to a passenger car and will therefore also contain 160 g c-PentaBDE per impacted truck;
- **Minibuses:** A country specific impact factor 320 g c-PentaBDE (corresponding to PUR foam of two passenger cars or 32 kg PUR foam) (BCCC-Africa, 2012).

The estimated amount of POP-PBDEs in all impacted vehicles in Trinidad and Tobago is noted in Table 6 below. This represents the inventory of POP-PBDEs in vehicles in 2016. These vehicles are either on the road or stockpiled for further processing and/or disposal.

Table 6: Total amount of c-PentaBDE (TetraBDE, PentaBDE, HexaBDE and HeptaBDE) in all impacted vehicles in Trinidad and Tobago for 1985 – 2010

Vehicle Type	No of impacted vehicles	C-PentaBDE /kg	TetraBDE /kg	PentaBDE /kg	HexaBDE /kg	HeptaBDE /kg
Cars	331,311	2,650.5	874.7	1,537.3	212.0	13.3
Trucks	23,877	191.0	63.0	110.9	15.3	0.95
Mini Buses	3,258	52.1	17.2	30.1	4.2	0.25
TOTAL	358,446	2,893.6	954.9	1,678.3	231.5	14.5

As indicated prior, in May 2017, DecaBDE was added to the list of POPs-PBDEs. DecaBDE can degrade in thermal processes, environmental processes and in biota to lower brominated PBDEs including POP-PBDEs. DecaBDE is present in polymers in vehicles, and exemptions for the continued use in specific parts in vehicles may be required in the short-term.

Other articles of interest included furniture and mattresses, especially if they were imported from the United States of America or the United Kingdom. In the United States of America, there is the Flammable Fabrics Act (1953) which regulates the manufacture of highly flammable clothing, interior furnishings as well as paper, plastic, foam and other materials used in wearing apparel and interior furnishings. In the United Kingdom, flammability of textiles and fabrics fall under the Furniture and Furnishings (Fire) (Safety) Regulations 1988. Trinidad and Tobago also import furniture from Brazil, but the flammability standards there are unknown. As Trinidad and Tobago does not have flammability standards for these products, it could not be determined if POP-PBDEs are present in these items that were imported. Detailed investigations such as screening would have to be conducted.

In respect of HBCD, it could not be determined whether HBCD was present in the polystyrene used in the construction sector. Similarly, it could not be determined if HBCD was present in curtains/ drapery or textiles. An inventory of HBCD in indoor use like curtains, furniture and draperies, as well as HBCD in textiles in vehicles, or their possible presence in children's sleepwear could not be established in this preliminary inventory since it is not known what share of these materials are treated with HBCD. The analytical capacity for monitoring HBCD does not exist in Trinidad and Tobago.

2.3.4 Assessment of Hexachlorobutadiene (HCBD) (Annex A, Part I)

Hexachlorobutadiene (HCBD) was listed in Annex A and C of the Stockholm Convention in 2015.

Globally, the most relevant source of HCBD was (and is) the production of chlorinated solvents (tetrachloroethylene, trichloroethylene, tetrachloromethane) and hexachlorocyclopentadiene (intermediate of cyclodiene pesticides). The HCBD inventory guidance stresses that Parties that have neither current nor past production of these organochlorines are not expected to have major HCBD production, releases, or contaminated sites (UNEP, 2017f). This is also the case for Trinidad and Tobago.

Minor amounts of unintentionally produced HCBD may be imported in perchloroethylene used for dry cleaning (see section 2.3.7).

Since HCBD has been used to a minor extent in transformers or as hydraulic fluid, minor amounts may still be in use. Waste oils, possibly containing HCBD from former use in transformer or hydraulic oils, have not been analysed for HCBD impurities in the management of waste oils by either the government or private sectors in Trinidad and Tobago.

Therefore, it is the likely possibility that the waste oils and other wastes that may contain HBCD, in particular from dry cleaning using perchloroethylene, may be disposed at landfill or dump sites.

2.3.5 Assessment of Dichlorodiphenyltrichloroethane (DDT) (Annex B, Part II)

Table 4 in section 2.3.1 indicated that DDT was used in Trinidad and Tobago prior to 1990. It was deregistered in that year and is no longer in use. Remaining stocks of DDT however, had been stockpiled for a number of years before eventually being exported to Canada for final disposal in 2005.

2.3.6 Assessment of Perfluorooctane Sulfonic Acid (PFOS), Its Salts and Related Substances (Annex B, Part III)

The National Inventory on PFOS and related substances for the inventory year 2016 focused on the main activities and sectors of concern. These included fire-fighting activities, metal plating, oil exploration and production and aviation hydraulic fluids. The SC inventory guidance for PFOS has been considered for the inventory (UNEP, 2017g).

Other articles that potentially contain PFOS such as synthetic carpets, textiles and paper products, were not examined as it was not possible to gain access to the information for this inventory. The majority of

these potentially PFOS containing products would have been manufactured prior to 2002, and as such are assumed to have already been disposed, with the exception of synthetic carpets which have a long service life and might still partly be in use.

The inventory found that PFOS was not currently used in the oil and gas exploration and production or metal plating sectors. Additionally, PFOS was not found in any of the firefighting foams included in the inventory.

It is highly likely however, that PFOS would have been used in firefighting foams in the past and possibly also in the metal plating industry. Therefore, the sites where firefighting foams have been used in the past, including firefighting training sites (see PFOS contaminated sites in section 2.3.8.4), may be contaminated with PFOS. Also, the areas where waste from the metal plating industry has been disposed in the past and the production area can be considered potentially contaminated.

Furthermore, it should be noted that Perfluorinated Alkylated Substances (PFAS) are an emerging international issue for the Strategic Approach to International Chemicals Management (SAICM), and as such, there is some avenue for more work to be done as PFAS such as Perfluorooctanoic Acids (PFOA) are found in these fire-fighting foams.

Table 7: Quantity of firefighting foams identified and their brand names.

Type of Foam	Quantity (Litres)
Alco Seal Foam in Fire Tenders	17,002
Alco Seal	79,915
Ansulite (ARC-FFP)	2,603
Thunderstorm	53,262
Buckeye Platinum	11,447
ChemguardC333	795
Chem Guard (AR-AFFF)	1,041
Chemguard and Buckeye Platinum	30,146
IFP Unilight AGFFF Type 1/3	12,500

The inventory report noted that Trinidad and Tobago could consider developing a PFAS/PFOA Stewardship Programme (similar to the United States Environmental Protection Agency (US EPA) 2010/2015 programme). This includes a commitment to a 95% reduction in facility emissions to all media of perfluorooctanoic acid (PFOA), precursor chemicals that can break down to PFOA, and related higher homologue chemicals and product content levels of these chemicals. It should be noted that the SAICM stakeholders working on Perfluorinated Compounds (PFCs) stewardship programmes are considering Perfluorinated Alkylated Substances (PFAS) as an emerging issue, so that this could be investigated further and where possible, alternatives sought.

2.3.7 Assessment of Releases of Unintentionally Produced POPs (UPOPs) (Annex C)

This section presents the estimate of UPOPs production from the National Inventory Report on UPOPs, 2016 (BCRC-Caribbean, 2017e).

UPOPs are commonly formed as by-products in the production of organochlorine chemicals, processes where elemental chlorine is present and thermal processes conducted in the presence of all forms of chlorine. The UPOPs listed in Annex C are as follows:

- Polychlorinated dibenzo-p-dioxins (PCDDs),
- Polychlorinated dibenzofurans (PCDFs),
- Polychlorinated biphenyls (PCBs),
- Hexachlorobenzene (HCB)
- Pentachlorobenzene (PeCB).and
- Polychlorinated naphthalenes (PCNs)

In the 2017 meeting of the Conference of the Parties (COP) to the Stockholm Convention, hexachlorobutadiene (HCBd) was also added to Annex C.

This inventory focused on PCDD/PCDFs solely, as these substances are indicative of the presence of other UPOPs. These are considered to be sufficient for identifying and prioritising sources of all UPOPs present in Trinidad and Tobago and devising applicable control measures. It should be noted that there are some processes where PCDD/PCDFs are not indicative of the presence of UPOPs, but these processes are not present in Trinidad and Tobago.

The methodology for this inventory was based on guidance provided in the 2013 UNEP Toolkit for the Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional POPs (UNEP, 2013). It involved an extensive review of existing literature, inclusive of the previous inventory, online research pertaining to data required for the calculations, where necessary, the conduct of meetings and workshops, the use of questionnaires as prescribed in the 2013 UNEP Toolkit for UPOPs and telephone interviews, where needed. The main activities carried out for data gathering and final data compilation and calculation were a Regional Inception Meeting and Training Workshop on the Update of the NIPs and Inventories on POPs in the Caribbean, the identification of key national stakeholders, a National POPs Inventory Project Initiation Meeting in Trinidad and Tobago, the dispatch of and follow-up on questionnaires, and finally, the calculation of the annual discharge of the ten (10) UPOPs source categories, as defined in the 2013 UNEP Toolkit for UPOPs.

The results of the UPOPs inventory are presented in Table 8 below. The total emissions of PCDD/PCDFs in 2016 for Trinidad and Tobago was found to be 23g TEQ/year, a 1g TEQ/year reduction when compared to the recalculated 2011 total emission of 24 g TEQ/year. The total emission for the 2011 inventory was recalculated using the updated emission factors provided in the 2013 UNEP Toolkit for UPOPs, considering the same data gathered from the 2011 inventory. The updated calculations resulted in a significant reduction of formerly calculated PCDD/F releases (67,169 g/year) which was based on an incorrect emission factor for flaring from oil refineries as guided by the former UNEP Toolkit.

The major source group for UPOPs release/concern were Ferrous and Non-Ferrous Metal Production (12g TEQ/year; primarily through thermal wire reclamation), open burning processes such as landfill and other fires (4.9g TEQ/year) and emissions from waste incinerators (4.8 g TEQ/year) (Table 8).

Table 8: Total 2016 annual releases (g TEQ/year) for the ten source groups of UPOPs (2016)

Group	Source Group	Annual Release (g TEQ/year)					
		Air	Water	Land	Product	Residue	Total
1	Waste Incineration	1.3	0.0	0.0	0.0	3.5	4.8
2	Ferrous and Non-Ferrous Metal Production	12.0	0.0	0.0	0.0	0.0	12.0
3	Power and Heat Generation	0.0	0.0	0.0	0.0	0.0	0.0
4	Production of Mineral Products	0.4	0.0	0.0	0.0	0.0	0.4
5	Transportation	0.1	0.0	0.0	0.0	0.0	0.1
6	Open Burning Processes	4.7	0.0	0.2	0.0	0.0	4.9
7	Production of Chemicals and Consumer Goods	0.0	0.1	0.0	0.0	0.0	0.1
8	Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0
9	Disposal	0.0	0.0	0.0	0.0	0.6	0.6
10	Identification of Potential Hotspots				0.0	0.0	0.0
1-10	Sub-Total	18.1	0.1	0.2	0.0	4.3	
Total		23					

Unintentional PCNs are formed - similarly to unintentional PCBs, HCB and PeCBz - as unintentional POPs together with PCDD/PCDF in thermal processes (UNEP, 2017c). PCNs are unintentionally formed in thermal processes together with other unintentional POPs such as PCDD/PCDF. Specific emission factors for PCNs for the thermal sources have not been established just yet, and the WHO has not assigned Toxic Equivalency Factors for PCNs. The UPOPs Toolkit and the PCN Inventory Guidance stress that UPOPs releases from most sources can be minimized or eliminated by the same measures that are used to address PCDD/PCDF releases. Therefore, the detailed updated inventory of PCDD/PCDF for Trinidad and Tobago allows the identification of priority sources of all UPOPs and the setting of measures and development of action plans to minimise releases of all unintentional POPs. For unintentional PCNs, the inventory guidance mentions a few processes where PCDD/PCDF releases are not indicative of PCNs but where specific assessment for PCNs and some other UPOPs are needed. These include the presence of unintentional PCNs in the production of chlorine, in industrial PCB mixtures and in the production of chlorinated solvents and chlorinated paraffins.

Chlorine is produced in Trinidad and Tobago, and it is possible that during this process, unintentional PCNs are likely formed at considerably higher levels than PCDD/PCDF. For a detailed inventory, the residues from chlorine production need to be measured for UPOPs.

It needs to be stressed that while no chlorinated paraffins are produced in Trinidad and Tobago, they are likely imported in products like PVC, rubber, paints and industrial oils (lubricants and metal working fluids). By those imports also, unintentional PCNs are likely imported to Trinidad and Tobago. Short chain chlorinated paraffins (SCCPs) have been listed as a POP in the Convention at the 2017 COP, however,

there is currently no guidance established to quantify the presence and import of SCCP in products. This will be a task in the future implementation of the Convention (see action plan in chapter 3.3).

2.3.8 Stockpiles, Contaminated Sites and Wastes

There are no known major stockpiles of POP pesticides in Trinidad and Tobago however, the Forensic Science Centre indicated that they have small amount of POPs in their laboratory for testing purposes. Mirex-S is the only POPs pesticide still registered, but it has not been imported into Trinidad and Tobago for the last three (3) years. According to the 2011 Inventory for POPs in Trinidad and Tobago, a survey on the identification and quantification of stockpiles of obsolete pesticides was conducted during the period November 2011 to February 2012 (Mohoyodeen, 2013). Moreover, the stockpile of dichlorodiphenyltrichloroethane (DDT) which was previously identified in the Inventory of Obsolete Pesticides and Toxic Chemicals for Disposal in Trinidad and Tobago in 1999, was disposed of by the Government of Trinidad and Tobago through the use of a Canadian firm specializing in the disposal of these toxic insecticides.

The FAO has undertaken a programme, "FAO Programme on the Prevention and Disposal of Obsolete Pesticides" from 2009 to 2017 to aid Caribbean countries in their inventories of pesticide usage and stockpiles, as well as provide assistance with the disposal of empty pesticide containers and eliminating stockpiles of banned and/or obsolete pesticides (FAO, 2013). The project is titled "Disposal of Obsolete Pesticides including POPs, Promotion of Alternatives and Strengthening Pesticides Management in the Caribbean". Data provided by the FAO for Trinidad and Tobago regarding obsolete/banned pesticides showed that of the list of banned pesticides in Trinidad and Tobago, six (6) chemicals were identified and marked for export for ultimate safe disposal. These included: Benomyl; Carbofuran; Ethylene Dichloride; Polyethylene Dichloride; Lindane and Toxaphene (FAO, 2016). It should be noted that of the six (6) chemicals identified, some of these were identified as being part of chemical mixtures while others were identified as being on their own. Out of these, Lindane and Toxaphene are POP pesticides.

There is the possibility that there may be stockpiles of old/expired firefighting foam and synthetic carpets that may contain PFOS or related substances. A more detailed inventory would be required to determine this. The Rapid Assessment for PCBs indicated that there were transformers that contain or may contain PCBs, and these would need proper disposal.

Each of the five (5) POPs inventory reports identified possible contaminated sites. The inventory studies identified all the landfill/dump sites in Trinidad and Tobago as possible contaminated sites for each of the POPs groups under consideration since different POPs wastes or POPs containing wastes have been disposed at these sites in the past. Also, there were frequent incidents of burning at these sites, with associated potential releases of disposed POPs and unintentional POPs. In addition, specific potentially contaminated or impacted sites have been discovered for the individual POPs groups. The current compilation is an initial first overview which needs further assessment. A range of the listed potentially contaminated/impacted sites might only have low contamination when empirical studies are conducted.

2.3.8.1 POPs Pesticides Contaminated Sites

Historically, Trinidad and Tobago had a large agricultural sector that was dominated by sugarcane. Coffee and cocoa were also major agricultural products. Caroni (1975) Limited was responsible for sugar production until its closure in 2003. The company also produced citrus and rice. Details of the historic use of pesticides could not be compiled. It is known that banana production historically used POPs pesticides such as toxaphene; however, bananas were not a significant crop in Trinidad and Tobago. Sites where POPs pesticides have been used and, in particular, sites where POPs pesticides have been stored can be contaminated by POPs pesticides for a long time due to their persistence (Toichuev et al., 2017).

The country also produced modest quantities of industrial timber. A range of POPs pesticides have, in the past, been used for wood treatment (PCP, Endosulfan, DDT, PCNs). From PCP use, wood treatment sites can also become contaminated with PCDD/Fs. Details on the historic use of preservatives in wood in Trinidad and Tobago could not be clarified during this first inventory of contaminated sites. There are, however, electricity poles currently stored by the electricity company that have been treated with PCP.

Large quantities of pesticides are imported for use in the agricultural sector and for vector and termite control. Land available for agriculture is being reduced to accommodate other economic sectors such as tourism and housing, yet available lands are expected to become more productive. Large amounts of pesticides are used to achieve this goal, as well as to meet the requirements of the products exported to international markets. Diversification of agriculture has taken place because of the negative experiences of mono-cropping such as sugar cane and in an attempt to provide local food. This has led to the cultivation of other crops, occasionally accompanied by use of new pesticides and increased doses (UNEP, 2002).

As a result, all areas that were under agricultural production are potential pesticide contaminated sites; however, due to the closure of the sugar manufacturing industry in Trinidad and Tobago in 2003, there would have been a significant reduction in the use of pesticides. The lands that were formerly used for sugarcane production have now been converted to smaller crop production, housing or have just been abandoned. Further assessment of the former use of pesticides in sugarcane production needs to be conducted considering that in other countries, PCDD/F contamination has been detected in related soils (Camenzuli et al., 2015; Grant et al., 2006).

Discussions with the PTCCB indicated that several sites that stored a variety of pesticides and chemicals were identified. These, together with their geographic coordinates using WGS84 datum, are listed in Table 9 below.

Table 9: Potentially contaminated sites in Trinidad and Tobago

Location	GPS Coordinates (decimal degrees)
Camden, Couva	10.428555, -61.4520679
Industrial Sawmilling in Penal	10.128230, -61.397085
Ministry of Agriculture in Penal	10.22055, -61.5903936
NIPDEC Warehouse in Chaguaramas <i>This was the last site of storage for Dichlorodiphenyltrichloroethane (DDT) that was eventually disposed of.</i>	10.6699709, -61.611653

2.3.8.2 PCBs Contaminated Sites

During the Rapid Assessment and Inventory of stored PCB oil and PCB contaminated equipment, the locations where equipment was sampled for PCBs has been recorded as noted as potentially contaminated sites for PCBs, as these sites are either current storage sites for PCB containing equipment or may have previously been storage sites. Figure 6 (Section 2.3.8.5) shows the on-land locations of the equipment that were sampled for PCBs.

Table 10 below details the sites and notes their respective Global Positioning System (GPS) coordinates.

Table 10: Site locations and GPS Coordinates for PCB contaminated sites

SITE LOCATION	GPS COORDINATES (degrees, minutes, seconds)
T&TEC - California (Pt. Lisas) Central Warehouse	10° 23' 46.980 N, -61° 28' 15.165 W
PLIPDECO- Point Lisas	10° 24' 53.895 N, -61° 28' 18.819 W
Petroleum Company of Trinidad and Tobago Limited (PETROTRIN) Santa Flora - Land North and East Coast Operations	10° 06' 44.619 N, -61° 33' 20.783W
PETROTRIN - Penal Operations	10° 10' 19.087 N, -61° 26' 54.026W
T&TEC - Central Distribution Centre, Lisas Blvd., Pt. Lisas	10° 25' 12.400 N, -61° 28' 29.700 W
T&TEC - Brechin Castle Sub-Station	10° 24' 7.208 N, -61° 27' 45.820 W
T&TEC - St. Mary's Substation	10° 11' 37.436 N, -61°18' 50.286 W
T&TEC - Rio Claro Depot	10° 18' 26.321 N, -61°10' 44.96 W
T&TEC - Rio Claro Sub Station	10° 18' 31.957 N, -61°10' 37.705 W
T&TEC - Galeota Substation	10° 09' 35.061 N, -61°00' 31.40W
T&TEC- Southern Distribution Area (San Fernando)	10° 16' 8.744 N, -61°27' 37.197 W
T&TEC- La Brea 33 kV Sub-station	10° 14' 25.689 N, -61°37' 42.847 W
T&TEC - Santa Flora Sub-station	10° 6' 40.024 N, -61°33' 16.922 W
T&TEC - Distribution East (Arima)	10° 36' 53.919 N, -61° 16' 19.389 W
T&TEC - Distribution East (Arima) - Supplies Yard	10° 36' 49.543 N, -61° 16' 18.429 W
T&TEC Transmission (Freeport at HCU Compound)	10° 28' 18.202 N, -61° 24' 16.151 W
PETROTRIN - Pointe-a-Pierre Refinery	10° 18' 59.083 N, -61° 27' 05.240 W
T&TEC - Wrightson Road Storage	10° 39' 17.840 N, -61°31' 06.904 W
T&TEC - Saddle Road Substation	10° 40' 30.048 N, -61°31' 12.923 W
T&TEC - Scarborough, Tobago Distribution Centre Yard	11° 11' 05.465 N, -60° 44' 17.712 W
T&TEC - Cove Eco-Industrial Estate Power Station	11° 08' 34.747 N, -60° 47' 33.171 W
PCS Nitrogen, Point Lisas	10° 24' 42.299 N, -61° 28' 43.509 W
Power Generation Company of Trinidad and Tobago Limited, Wrightson Road	10°39'23.28 N, -61°31'6.62 W

SITE LOCATION	GPS COORDINATES (degrees, minutes, seconds)
Caroni 1975 Ltd – Usine Ste. Madeline Factory	10° 15' 57.00 N, -61° 25' 18.00 W
Caroni 1975 Ltd – Brechin Castle Factory	10° 24' 41.463 N, -61° 27 '32.077 W

A study by the University of the West Indies (Mohammed et al., 2011) sampled sediments from three (3) near shore marine areas of the island of Trinidad for PCBs (Figure 5 below). The first sediments sampled were from the Sea Lots area on the west coast, in south Port-of-Spain Harbour, which receives urban run-off, discharge from several light industries, and drainage of effluents from the Beetham sewage treatment facilities and the Beetham municipal landfill which is unlined. The second near shore area sampled was just south of Sea Lots, and offshore of the Caroni Lagoon National Park, a mangrove wetland. The third near shore area sampled was on the east coast at Manzanilla.

Total PCB concentrations in Sea Lots sediments ranged from 62 to 601 ng/g (dry weight (dw), which was higher than at Caroni and Manzanilla, 13 and 8 ng/g dw, respectively. The levels of PCBs detected for all Sea Lots sites (concentration range) were higher than the Canadian Interim Sediment Quality (CaISQG) guideline value of 21.5 ng/g (21.5 µg/kg) for marine sediments. The PCB levels in the outer harbour and from the Caroni and Manzanilla sediment samples were below the CaISQG value.

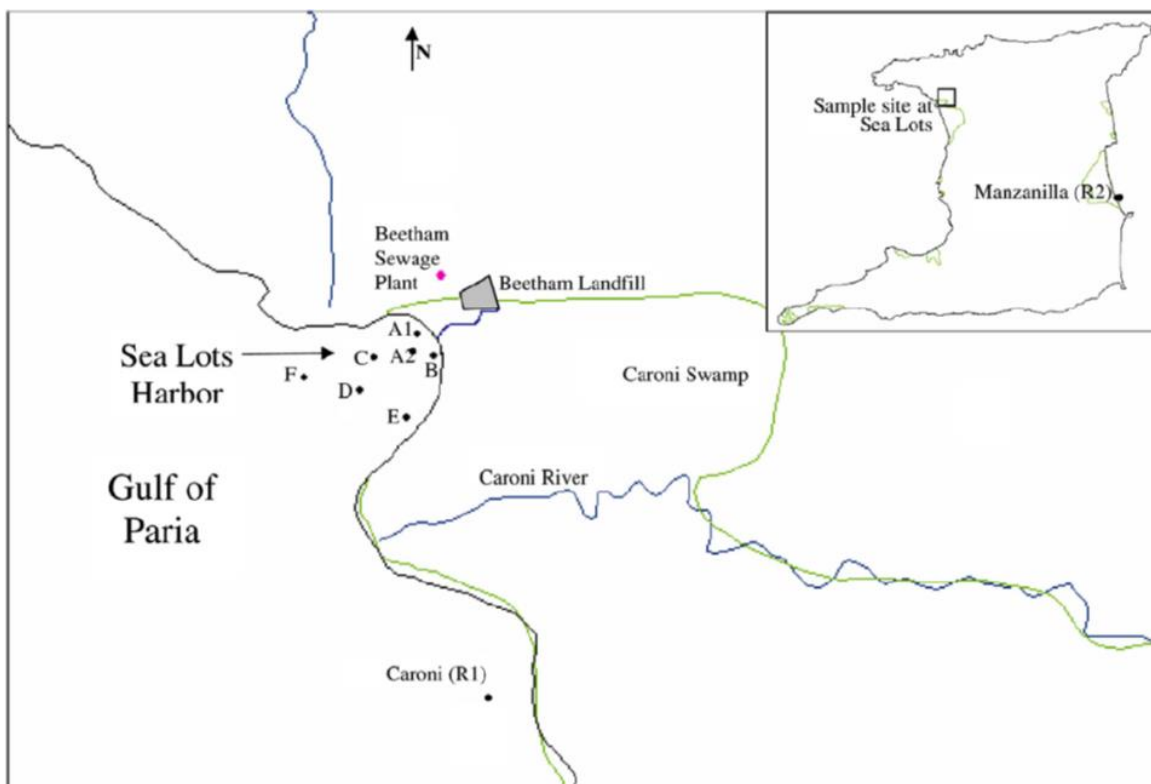


Figure 5: Sample Locations for Sea Lots in the Port of Spain Harbour and References at Caroni and Manzanilla (source: Mohammed et al., 2011)

2.3.8.3 POP-PBDE, HBB and HBCD Waste Management and Contaminated Sites and Hotspots

There are no national plans for WEEE and end-of-life vehicles, resulting in partially non-environmentally sound management of these goods.

There is however, some level of recycling done for WEEE. There are two (2) major EEE recycling companies. One company sends the entire product for export, while the other removes plastics and metals for recycling, and the residual components are packaged and exported to processing and disposal companies. The metal components are sold to the local scrap metal dealers or exported, and the plastics are recycled abroad (Garraway and Ott, 2010). However, the majority of WEEE ends up at the local landfill sites where they are usually co-mingled with other waste streams and where the plastic and polymers provide “fuel” for open burning.

Many end-of-life vehicles are salvaged for their metal components. The other components including plastic and polymers potentially treated with POP-BFRs (c-PentaBDE, DecaBDE and HBCD (Kajiwara et al., 2014)) are usually disposed of at the local landfill sites.

In both cases, there are also instances where these waste types would be dumped or abandoned along roadways, in remote areas and in rivers, which presents further environmental challenges.

Other materials or products that may potentially contain POP- Brominated Flame Retardants (POP-BFRs) like obsolete furniture, construction material and mattresses are all disposed of at the closest landfill site or informal dumpsites.

Since the former car manufacturing plants did not use BAT/BEP, there is a risk of soil contamination at these sites. All these plants would have transported their wastes to the closest landfill sites. This results in emissions of hazardous substances to the environment mainly to air, soil and underground water sources or to the nearest surface water sources. All the landfill sites and sites where these polymer fractions are disposed have frequent open burning which result in releases of POPs present in the waste and in the formation of UPOPs including PCDD/PCDFs and brominated PBDD/PBDFs (Gullet et al., 2009). Over time, these sites and the surrounding soils can become contaminated with POPs (Minh et al., 2003).

The major sites for consideration would be the landfill sites in Trinidad and Tobago. Other sites would also need to be explored as a recent national clean-up campaign indicated that end-of-life vehicles are usually abandoned in remote areas. These areas, together with riverbanks, also serve as dumping grounds for e-waste and used appliances.

The sites of local e-waste recycling as well as scrap-metal recycling could also be potential sources of contamination for PBDEs, PCBs and heavy metals, and these need to be investigated further. While there is no burning and smouldering at the formal e-waste and scrap metal recycling sites, there is the possibility that these activities occur at the informal sites. As such, PCDD/F and PBDD/F would also be possible contaminants.

Some other sites to consider would be the locations of former vehicle assembly plants as well as scrap yards for old furniture and plastics especially from vehicles. Many of these sites may have elevated levels of POPs-PBDEs due to the quantity of material that would have been disposed there.

The five (5) known landfills are located at:

- Beetham, Port of Spain;
- Guanapo, Arima;
- Forres Park, Claxton Bay;
- Guapo, Point Fortin; and
- Studley Park, Tobago.

The former vehicle assembly plants were located at:

- Morvant;
- Wallerfield, Arima; and
- Las Lomas.

Six (6) Electronic-Waste Recycling Centres were located at:

- California, Couva;
- Laventille;
- Arima;
- Connector Road, Chaguanas;
- Caroni Savannah Road, Chaguanas; and
- St. James, Port of Spain.

These sites are represented in Table 11 below, together with their Global Positioning System (GPS) coordinates.

Table 11: Locations of sites that are potentially contaminated or impacted with POPs-PBDEs

Type of Organization	Area	GPS Coordinates (decimal degrees)
Disposal Sites	Claxton Bay	10. 3772028, - 61.412738 (Forres Park)
	Port of Spain	10.3825.53, -61.29714 (Beetham)
	Arima	10.353703, -61.144206 (Guanapo)
	Guapo, Point Fortin	10.188081, -61.652187
	Tobago	11.976467, -60.666284
Former Vehicle Assembly	Wallerfield	10.6156638, -61.2567035
	Morvant	10.6588233, -61.4717933
	Las Lomas	10.5657223, -61.3214648.17
E-waste Recycling	California	10.4049308, -61.4754396
	Laventille	10.6469522, -61.4925337
	Connector Road, Chaguanas	10.5050894, -61.404653
	Caroni Savannah Road, Chaguanas	10.5334725, -61.4162323
	St. James	10.6747103, -61.536449

2.3.8.4 PFOS Contaminated Sites

PFOS have high chemical stability and low volatility and by these properties, are very persistent in the environment. As a result, they can be found in soil and groundwater as contaminants which persist decades after use and disposal. PFOS contaminated sites result mainly from fire-fighting activities and industrial uses as well as from releases from landfills and dumpsites.

Firefighting training takes place at the major airports in Trinidad and Tobago (Piarco International Airport and ANR Robinson International Airport, respectively). Training also takes place at the major industrial sites in Trinidad. These would all be considered potentially contaminated sites for PFOS. The landfill sites would also be considered potentially contaminated sites as historically, products that contained PFOS would be disposed there (UNEP, 2017g). Other sites noted include facilities where chrome plating takes place. While the inventory stated that PFOS is not used now, there is the possibility that there would have been historic use. Table 12 below lists the potential sites and their GPS Coordinates.

Table 12: Locations of potentially PFOS contaminated sites in Trinidad and Tobago

Site	GPS Coordinates (decimal degrees)	Location
Piarco International Airport, Firefighting Training Facility	10.593763, - 61.337457	Piarco
Piarco Fire Station	10.592530, - 61.340033	Piarco
Wrightson Road, Fire Station	10.553101, - 61.519363	Port of Spain
Mon Repos Fire Station	10.279709, - 61.450396	San Fernando
ANR Robinson International Airport, Tobago	11.151350, - 60.542331	Crown Point
LABIDCO Industrial Estate	10.233742, - 61.636271	La Brea
Point Lisas Industrial Estate	10.374336, - 61.477244	Point Lisas
Beetham Landfill Site	10.639831, - 61.485506	Port of Spain
Forres Park Landfill Site	10. 3772028, - 61.412738	Claxton Bay
Guanapo Landfill Site	10.593849, - 61.247964	Guanapo, Arima
Guapo Disposal Site	10.188081, - 61.652187	Point Fortin
Studley Park Landfill Site, Tobago	11.976467, - 60.666284	Studley Park
Decommissioned Oil Refinery, Point Fortin	10.1860982, - 61.6914349	Point Fortin
Oil Refinery, Pointe a Pierre	10.3158704, - 61.4553575	Pointe a Pierre
Chrome Plating Facility – Industrial	10.3041648, - 61.4516109	Marabella
Chrome Plating Facility – Steel pan	10.6399711, - 61.3798642	Trincity

2.3.8.5 PCDD/PCDF and UOPs Contaminated Sites

Many industrial activities are undertaken in Trinidad and Tobago. Furthermore, the country has a long agricultural history. As a result, there are several sites that would be considered potentially contaminated that would require risk assessments and then further site-specific evaluations.

These sites would include:

- Production sites of chlorine;
- Former timber manufacture and treatment sites;

- Sites where PCBs were present such as those of the power generation companies;
- Landfill sites;
- Waste incinerators;
- Former dumpsites;
- Primary production and manufacturing sites of PVCs;
- Sites of major fire accidents;
- Dredging of sediments and contaminated flood plains; and
- Metal industries.

In Trinidad and Tobago, the sites considered potentially contaminated are listed in Table 13. Some of these sources like cement plants, glass production or power plants have relatively low contamination potential while incinerators and open dumping sites with frequent open burning incidents have high release potential.

Table 13: Potential PCDD/PCDF contaminated sites in Trinidad and Tobago

Organisation	Address	GPS Coordinates (degrees, minutes, seconds)
Disposal Sites	Claxton Bay	10°22'37.93 N, - 61°24'45.86 W (Forres Park)
	Port of Spain	10°38'25.53 N, -61°29'7.14 W (Beetham)
	Arima	10°35'37.03 N, -61°14'42.06 W (Guanapo)
Waste Incineration	San Fernando	10°16'49.23 N, -61°28'6.87 W
	La Brea	10°14'11.41 N, -61°38'5.73 W
	Las Lomas	10°33'56.6 N, -61°19'17.273 W
Chlorine Production	Savonetta, Point Lisas	10°22'34.533 N, -61°28'43.574 W
Petroleum Refining	Pointe-a-Pierre	10°18'55.23 N, -61°27'25.22 W
Cement Manufacture	Claxton Bay	10°21'6.233 N, -61°27'50.317 W
Brick Manufacturing	Chaguanas	10°30'56.839 N, -61°22'14.177 W
Paper Production	O'Meara Industrial Estate, Arima	10°37'2.04 N, -61°17'3.72 W
PVC Production	Trincity	10°35'53.03 N, -61°16'5.27 W
	Tunapuna	10°38'14.749 N, -61°22'45.949 W
Glass Production	Champ Fleurs	10°38'54.24 N, -61°25'46.87 W
Power Generation	Couva	10°24'14.167 N, -61°27'48.767 W
	Point Lisas	10°25'5.702 N, -61°29'11.876 W
	Penal	10°08'50.42 N, -61°28'35.936 W
	La Brea	10°12'58.677 N, -61°37'45.395 W
	Tobago	11° 08' 34.747 N, -60° 47' 33.171 W

Organisation	Address	GPS Coordinates (degrees, minutes, seconds)
Iron and Steel Production	Point Lisas	10°23'56.032 N, -61°29'20.585 W 10°24'13.213 N, -61°29'6.5 W

Figure 6 below gives a summary of the potentially POPs contaminated sites discussed above (section 2.3.8).

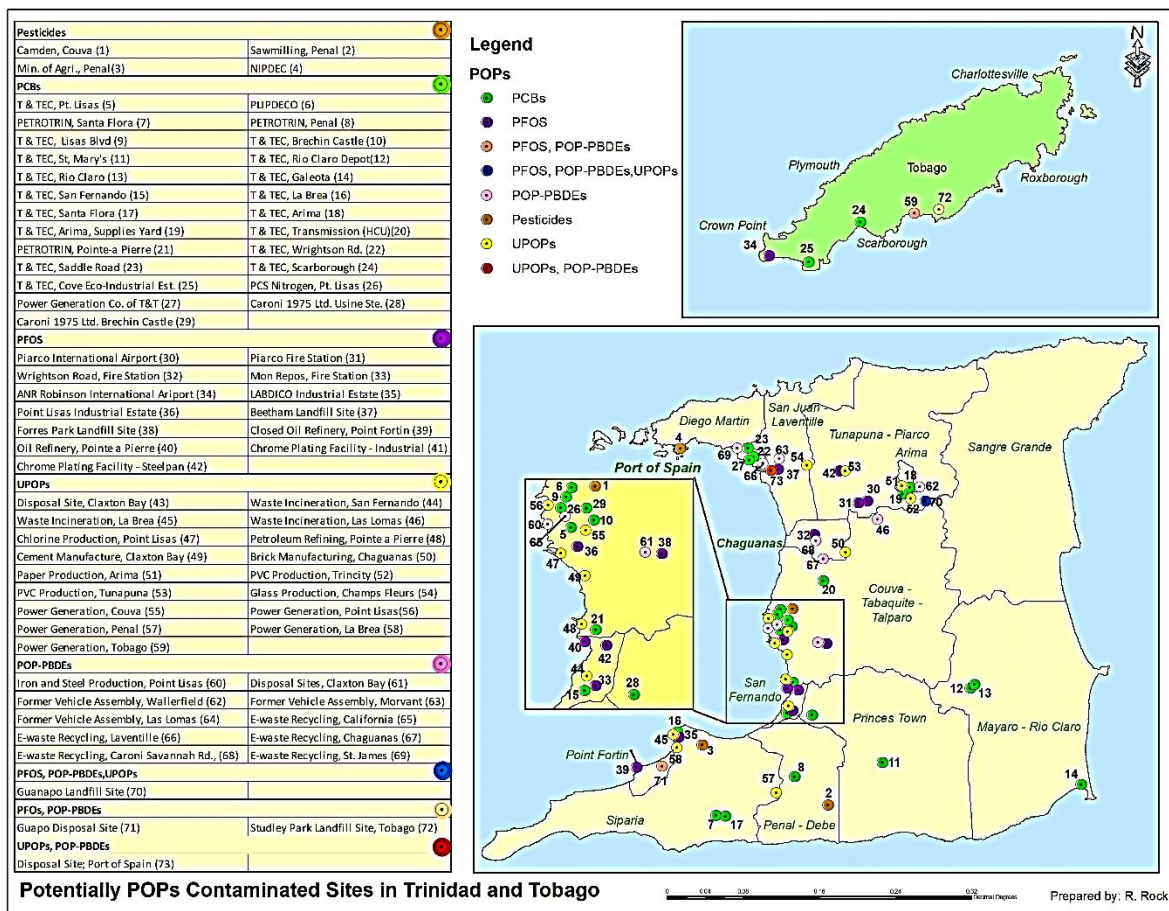


Figure 6: Summary of Potentially POPs Contaminated Sites in Trinidad and Tobago

2.3.9 Future Production and Use of POPs – Requirement for Exemption

There is no production of POPs pesticides or chemicals in Trinidad and Tobago. In the assessment of individual POPs with exemption of use (PFOS, lindane, PCP, DDT, PBDE recycling), no need of any exemption has been found. Although Mirex-S has not yet been de-registered, this is not being used as there are many alternatives. Indeed, most of these POPs have already been banned. For the POPs listed as of the 2017 COP, SCCPs and PFOA, further assessment would be necessary.

2.3.10 Monitoring Programmes

There are no routine programmes to monitor releases of POPs, or to monitor the environmental effects of POPs. There is limited research into the accumulation of POPs in the environment with most research focused in the Sea Lots area of Trinidad. Currently, there is no data available on the types of PBDEs, PCBs and pesticides in the marine sediments and their sources in Trinidad and Tobago.

PCBs have been measured in sediments by the University of West Indies (Mohammed et al, 2011). PCB levels were partly above Canadian environmental standards (see section 2.3.7). Total PCB concentrations in Sea Lots sediments ranged from 62 to 601 ng/g dry weight (dw) which was higher than at Caroni and Manzanilla, 13 and 8 ng/g dw, respectively. The levels of PCBs detected for all Sea Lots sites (concentration range) were higher than the Canadian Interim Sediment Quality (CaISQG) guideline value of 21.5 ng/g (21.5 µg/kg) for marine sediments. The PCB levels in the outer harbour and from the Caroni and Manzanilla sediment samples were below the CaISQG value.

A study conducted by the University of Trinidad and Tobago (UTT) from 2012 to 2016 (Balgobin, 2016) indicated that the main sources of polycyclic aromatic hydrocarbons (PAHs) releases are from urban and industrial activities. This suggests that petroleum combustion and petrogenic processes are contributing to the hydrocarbon pollution of the Gulf of Paria. As shown by the PAH levels in mussels that were studied, this can contribute to bioaccumulation and risk to the benthic ecosystem. This study shows that two (2) main hotspots for pollutant inputs to the Gulf of Paria can be identified as the Port-of-Spain and Pointe-à-Pierre areas. The biomarker results indicate that hydrocarbon inputs into the Gulf of Paria may be due to petroleum sources. In addition, the data indicates that natural oil seepages contribute somewhat to the hydrocarbon concentrations in the study area. Crude oil pollution is most dominant in the southern part of the Gulf of Paria.

In 2012, the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) conducted a global survey to generate consistent data from five (5) United Nations regions on concentrations in human milk of the twenty-two (22) persistent organic pollutants listed in the Stockholm Convention (UNEP/WHO, 2013). Although Trinidad and Tobago was not included, several Caribbean countries such as Antigua and Barbuda and Barbados participated in this study. Concentrations of POPs in human milk are considered good indicators of the actual body burden.

The results indicated that measurable concentrations of perfluorinated chemicals have been detected in human milk. The results for PBDEs also showed high concentrations in the Caribbean region compared to most countries in Europe and Asia but lower than the United States (UNEP/WHO 2013).

2.3.11 Information, Awareness and Education

A critical part of the implementation of the five (5) year road map contained in the NIP was the generation of a public awareness campaign with the aim of sensitizing the nation on the adverse effects of POPs and the mechanisms to reduce human exposure to such toxins, as well as providing information on the NIP.

As such, the Environmental Policy and Planning Division (EPPD), currently under the Ministry of Planning and Development (formerly the Ministry of Water Resources and the Environment) and with funding from the United Nations Development Programme (UNDP) had developed a limited, but comprehensive, public awareness campaign. This was built on material previously developed by a public awareness consultant during formulation of the first NIP. The target audience for this campaign included decision makers, ministry staff, industry employees and the general public.

In this regard, the main elements of the public awareness package included:

1. Printing and distribution of the NIP in hard and soft copy format;
2. Development, printing and distribution of brochures, informational flip cards, informational CD Jackets and posters on POPs;

3. Publishing of articles on POPs and Polychlorinated Biphenyls (PCBs) in the Trinidad and Tobago Chamber of Industry and Commerce's (TTCIC) 'Contact' Magazine and the Energy Chamber's 'Energy Now' Newsletter;
4. Development of a 45 second advertisement on POPs;
5. Promotion of the 45 second advertisement on local TV stations in Trinidad and Tobago, on screens at Movie Towne Port of Spain, Caribbean Cinemas South Park and on various social media platforms;
6. Development of a web platform showcasing information on POPs and the NIP on the EPPD's Blog spot: <http://eppd-tt.blogspot.com/>; and
7. Procurement of POPs branded promotional items, for e.g., a bamboo cutlery set, pencils and bags.

These promotional materials have been distributed to key actors in the waste and chemicals field, to schools across the nation as part of an education campaign and to the general public during public awareness events.

Examples of the material are shown below:

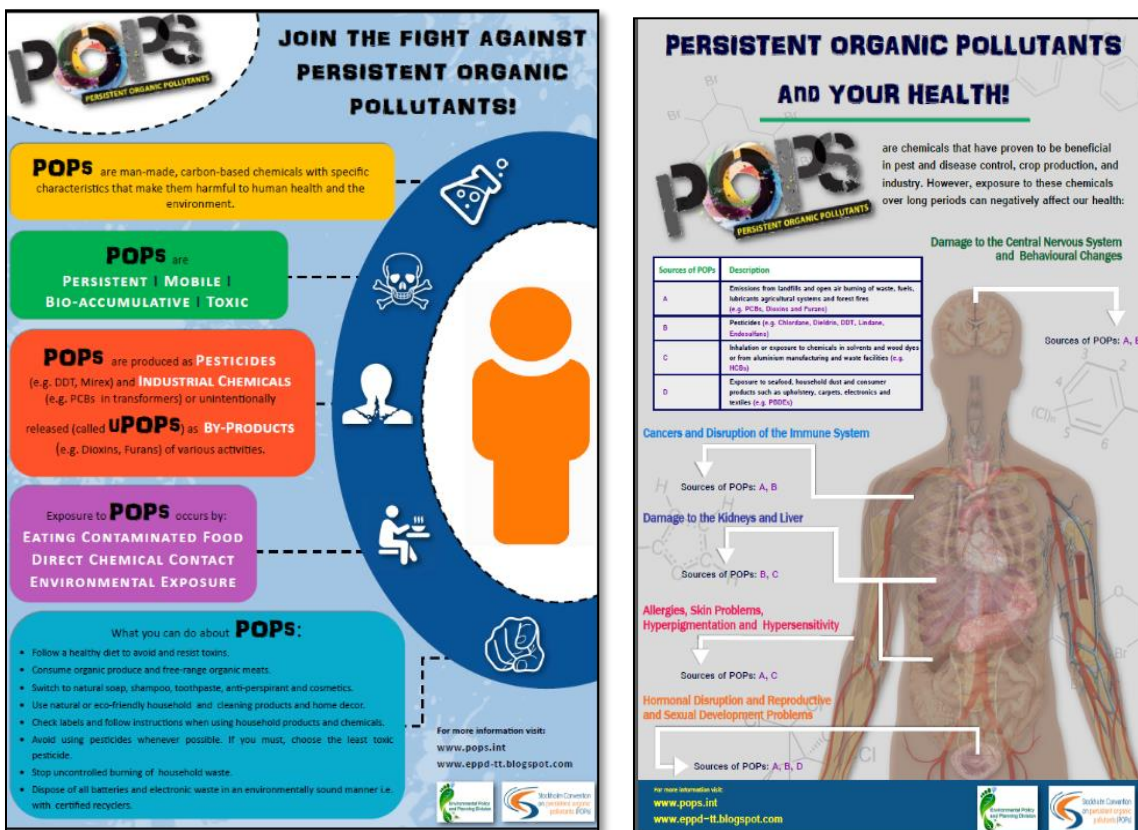


Figure 7: POPs Information Posters developed by the EPPD

2.3.12 Mechanism to Report Under Article 15 on Measures Taken to Implement the Provisions of the Convention

Trinidad and Tobago communicates formally to the Stockholm Convention through the Focal Point which is the Ministry of Planning and Development. This reporting is done through an online electronic reporting system (SC-ERS).

2.3.13 Information Exchange with Other Parties

Through the work of the BCRC-Caribbean under the GEF 5558 Project, there has been a regional approach to the NIP update process and frequent information sharing amongst eight (8) Caribbean countries. This has been accomplished through a series of regional workshops. The eight (8) countries that are involved in the GEF 5558 Project are: Antigua and Barbuda, Barbados, Belize, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname and Trinidad and Tobago.

For the purpose of information sharing, other non-GEF 5558 project Caribbean nations were invited to attend the regional workshops virtually. Additionally, further to the development of the NIPs, communication products will be developed and shared with all stakeholders for increased public awareness, and all the pertinent information gathered through the project will be compiled in a regional information database and shared across the Region.

Other agencies such as the Food and Agricultural Organisation (FAO) have also done work on POPs and pesticides regionally; the synergies have been recognized and therefore cross-cutting information is also shared.

2.3.14 Relevant Activities of Non-Governmental Organisations (NGOs)

There are many environmental Non-Governmental Organizations (NGOs) operational in Trinidad and Tobago. They focus on a variety of areas including recycling, climate change, agriculture, advocacy, sustainable development and fisheries. While there were no initiatives of NGOs specifically related to the Stockholm Convention or POPs found or released in Trinidad and Tobago, NGOs are valuable allies in critical areas such as waste management and agriculture.

2.3.15 Overview of Technical Infrastructure for POPs Assessment, Measurement, Analysis, Alternatives and Prevention Measures, Research and Development – Linkage to International Programmes and Projects

The Institute of Marine Affairs (IMA), the Chemistry Department of the University of the West Indies (UWI) and the University of Trinidad and Tobago (UTT) have participated in local and regional programmes such as a Regional Study, the Caribbean Coastal Pollution Project (CCPP) to measure concentrations of POPs in the tissue of selected marine fish species. The CCPP aims at the assessment, monitoring and management of Persistent Organic Pollutants (POPs) and Persistent Toxic Substances (PTS) in the Coastal Ecosystems of the Wider Caribbean Region (WCR) and commenced in September 2007. The BCRC-Caribbean, through the GEF-5558 Project, will be pursuing more POPs activities beyond the NIP update.

There is some analytical capacity in Trinidad and Tobago for POPs and where this cannot be conducted, these tests can be facilitated by foreign laboratories.

2.3.16 Overview of Technical Infrastructure for POPs Management and Destruction

This section presents information on:

- Waste Disposal Capability;
- Assessment Capability.

There does not appear to be any Research and Development related to the replacement and phasing out of POPs in Trinidad and Tobago at present.

2.3.16.1 Waste Disposal Capacity

As an industrialised country, industrial wastes have been produced and disposed of by both public and private sector waste disposal companies. There is some limited capacity to manage a wide range of industrial wastes, including:

- Oilfield Liquid Waste (hydrocarbon contaminated);
- Used Motor Oils;
- Hydrocarbon Contaminated Soil;
- Chemical Waste;
- E-waste;
- Asbestos Waste;
- Fluorescent Light Bulbs;
- Plastics; and
- Paper.

Treatment and disposal technologies used by these companies include:

- Incineration;
- Electro-Coagulation;
- Bioremediation;
- Enzyme Treatment;
- Fixing with Cement (fluorescent bulbs); and
- Encapsulation (asbestos waste).

However, there are concerns about the conformance of these companies to international guidelines and standards. These concerns will hopefully be addressed once the proposed Waste Management legislation is enacted.

2.3.16.2 Assessment Capability

Private and public sector laboratories have the capability to assess some of the POPs, either totally in-house or in partnership with international experts. These agencies and companies are also capable of providing information on alternatives, on prevention measures and on the management of POPs.

2.3.17 Impacted Populations and Environments

The adverse human health and environmental effects of POPs and UPOPs are well-documented in international literature; however, no country-specific studies of the impact of POPs in Trinidad and Tobago are available. Private companies undertake soil and groundwater surveys based on their specific requirements, but there is no data capture infrastructure set up by the government to collect and safeguard the data on contaminated soil and groundwater. No data on human POPs-levels have been identified in the preparation of this NIP.

Humans can be affected by POPs and UPOPs via a number of pathways:

- Ingestion (eating contaminated food or drinking contaminated water);
- Inhalation (breathing contaminated air in the environment, on farms or in the workplace);
- Dermal Contact (working with POPs chemicals in workplaces or on farms, working with contaminated soil, irrigation with contaminated water or bathing in contaminated water).

In the past, many spills and other accidents took place causing soil and groundwater contamination from oil exploration and production activities onshore, from firefighting activities at industrial sites and from releases from landfills and dumpsites which impacted privately-owned areas. Although the contaminated sites are not registered, a summary of possible contaminated sites was made based on oral information

collected during the workshops, site visits and interviews. A related assessment of human exposure has not been performed. This is a task identified within the NIP implementation.

While many of the industries have stringent health, safety and environment (HSE) programmes to protect their employees and the environment, other sectors are not so stringent. As a result, there is the possibility of human and environmental exposure to POPs. This is an even greater concern for the informal sector where open burning of copper wire is commonplace.

2.3.18 Assessment and Listing of New Chemicals

There is a system established between the SC Focal Point and the PTCl as it relates to those chemicals that would fall under the purview of the latter to determine the status of the chemicals proposed for listing before a decision is made at the COP. Also, the PTCl has indicated that they have the capability to undertake assessment studies toward the listing of new chemicals.

The same would not apply however, for industrial chemicals contained in products as the PTCl does not have this capacity.

2.3.19 Chemicals Already in the Market

At present, there appears to be no listed POPs chemicals presently on the market in Trinidad and Tobago. However, there are may be more than 500 potential POPs currently in use worldwide (Scheringer et al., 2012). These chemicals are currently not assessed by the authorities in Trinidad and Tobago. The PTCl's registration system, however, allows the government to deregister chemicals that are deemed unsuitable for continued use. The Chemical Management Plan of the MEEI will also allow the government to deregister chemicals that are presently in use in the energy sector and are deemed unsuitable for continued use.

2.4 Implementation Status

The National Implementation Plan (NIP) for Trinidad and Tobago was submitted to the SC on January 22nd, 2015. The projected effective timeframe for applicability of the NIP is over the five (5)-year period from 2014 to 2018 inclusive.

2.4.1 Institutional Framework

The following authorities were involved in NIP implementation activities:

- The former Ministry of Water Resources and the Environment;
- The Ministry of Energy and Energy Industries;
- The Pesticides and Toxic Chemicals Control Board (PTCCB);
- The former Ministry of Food Production (MFP);
- Ministry of Trade and Industry (MTI);
- The Customs and Excise Division;
- The Environmental Management Authority (EMA); and
- The former Department of Natural Resources and the Environment (DNRE) from the Tobago House of the Assembly.

The national POPs management priorities are summarised below in Table 14, together with the status of implementation of the suggested action items.

Table 14: NIP Implementation Status

Convention Article	Level of Implementation	Comments
ARTICLE 3 Measures to reduce or eliminate releases from intentional production and use	Refer to sections 2.3.1 and 2.3.2. Article 3 deals with POP pesticides, PCBs and DDT.	POPs are not intentionally produced in Trinidad and Tobago. However, POPs pesticides have been used in the past and PCBs are still present.
ARTICLE 4 Register of exemptions	Currently there are no POPs used in Trinidad and Tobago, and no exemption has been registered.	
ARTICLE 5 Measures to reduce or eliminate releases from unintentional production	Refer to section 2.3.7.	
ARTICLE 6 Measures to reduce or eliminate releases from stockpiles and wastes	Refer to section 2.3.8.	DDT identified from previous inventory has been exported for disposal. Disposal of obsolete pesticides and PCBs facilitated through the FAO/GEF 5407 project.
ARTICLE 7 Implementation plans	Submitted January 2015.	
ARTICLE 8 Listing of chemicals in Annexes A, B and C	N/A	N/A
ARTICLE 9 Information exchange	Refer to section 2.3.13.	Through the GEF 5558 project, there is information sharing across the Caribbean.
ARTICLE 10 Public information, awareness and education	Refer to section 2.3.11.	Information products were developed for POPs, and these are available for distribution.
ARTICLE 11 Research, development and monitoring	Refer to section 2.3.10.	Some research activities have been undertaken including monitoring for POPs in fish.
ARTICLE 12 Technical assistance	BCRC-Caribbean UNIDO UNEP IMA UTT UWI	GEF 5558 Project has been developed to assist Trinidad and Tobago with fulfilling its obligations to the SC. It includes assistance for NIP development but also includes components for communication and information management and a legislative review. A demonstration project for the development of a remediation plan for the Guanapo Landfill Site will also be undertaken for Trinidad and Tobago.

Convention Article	Level of Implementation	Comments
ARTICLE 13 Financial resources and mechanisms	GEF UNEP	GEF provided financing for the GEF 5558 Project. UNEP provided the financing for the first NIP.
ARTICLE 15 Reporting	Submitted 3 rd report on 18/12/2014.	
ARTICLE 16 Effectiveness evaluation	Trinidad and Tobago has not participated in the WHO human milk study for the basic POPs (POPs pesticides, PCB, PCDD/F and HCB).	
ARTICLE 17 Non-compliance		
ARTICLE 19 Conference of the Parties	Trinidad and Tobago has attended COP meetings.	
ARTICLE 21 Amendments to the Convention		
ARTICLE 22 Adoption and amendment of annexes		
ARTICLE 24 Signature	Trinidad and Tobago has ratified the Convention (see below).	
ARTICLE 25 Ratification, acceptance, approval or accession	December 15 th , 2002	
ARTICLE 26 Entry into force	May 17 th , 2004	

3 STRATEGY AND ACTION PLAN ELEMENTS

Section 3 addresses the two following elements: the formal policy statement and the implementation strategy for the NIP. The implementation strategy sets out specific action plans or strategies to achieve Convention obligations and other additional objectives set by the country.

3.1 Recommended Policy Statement

The following is a recommended Policy Statement on POPs and the Stockholm Convention:

The Government of Trinidad and Tobago acceded to the Stockholm Convention in 2002 and is committed to adopting a precautionary approach to protect human health and the environment from Persistent Organic Pollutants (POPs). The National Policy on POPs integrates strategies for addressing POPs and sustainable development and harmonises with the National Environmental Policy and other relevant existing policies.

The Government of Trinidad and Tobago has conducted research and consultations to inform the development and implementation of a National Implementation Plan (NIP) which will be reviewed and updated periodically to ensure that it remains effective. The NIP will seek to:

- Eliminate and prohibit the production, use, import and export of chemicals listed in Annex A of the Convention.
- Control the use and import of chemicals listed in Annexes A (with specific exemptions and/or acceptable purposes) and B of the Convention.
- Eliminate the release of POPs and unintentionally produced POPs (UPOPs).

The Government is committed to and will ensure the availability of the necessary resources and support to:

- Implement the National Solid Waste Management Policy and the Integrated Solid Waste Management System.
- Review and strengthen existing legislation and enforcement systems as they relate to the monitoring of POPs and UPOPs.
- Assess and strengthen local environmental and regulatory monitoring and laboratory testing capability for POPs.
- Encourage the adoption of alternative methods, materials and processes to prevent formulation and release of POPs.
- Encourage the application of best available techniques (BAT) and best environmental practices (BEP) in managing existing and potential sources of POPs and UPOPs.
- Increase awareness in the general public, industry and government officials about POPs and their risks to human health and the environment.
- Encourage participation by stakeholders in addressing health and environmental effects of POPs and developing appropriate responses to manage human and ecosystem risks from exposure to POPs and UPOPs.
- Continue appropriate research and development into the management of POPs, their effects on human health and the environment and measures to alleviate any such effect.

The Government, even as it continues its quest to further develop the country for the betterment of its citizens, will also strive to protect the environment and the health of its people. The National Policy on POPs will therefore be reviewed periodically to ensure continued relevance and compliance with the Convention.

3.2 Implementation Strategy

Unintentionally produced POPs (UPOPs) from industrial processes, as by-products or waste, are currently the main potential source of POPs releases in Trinidad and Tobago, but the estimate of the extent of the problem has significant data gaps. The health effects of such releases are also unknown for Trinidad and Tobago. Therefore, any meaningful strategy for this NIP must include a significant effort to fill data gaps (to the extent practical) in the short term. Similarly, there is insufficient awareness of the issues related to POPs, and as such education and awareness campaigns are necessary at this point. Behaviour change with respect to waste management is a key long-term desired outcome.

In contrast, there is a clear understanding of the laws, regulations and procedures needed to be put in place. The Air Pollution Rules have listed dioxins and furans as part of the Schedules and as such, companies are required to monitor these if necessary and thus implement reduction measures.

At the governmental level, all relevant ministries will be involved in the NIP implementation in which each ministry will have different responsibilities with respect to its function. This inter-ministerial coordinating mechanism is considered vital in addressing chemicals and waste management issues (including POPs) at large, as important topics are linked to the Sustainable Development Goals (SDGs) of the 2030 Sustainable Development Agenda (MPD, 2016): Goal V: Valuing and Enhancing Our Environment.

To address the national priority of chemicals and waste, a coordinated approach will be adopted, with co-operation among all relevant stakeholders at all levels and all sectors. **The lead for this co-ordinated approach can either be the PTCCB or the Ministry responsible for the Environment (currently the Ministry of Planning and Development).** Responsibilities related to the sound management of chemicals and waste as well as those involved in activities that influence chemical safety, including private sector, industry, labour and public interest groups will be assigned.

3.3 Activities, Strategies and Action Plans

This section will be examining all five (5) POPs groups in more detail and the specific action plans for each group. There are however, some over-arching actions that are required at the beginning of the process such as the establishment of the coordinating mechanism mentioned before. There will be the need for institutional and regulatory strengthening, capacity development, update of inventories, remediation of contaminated sites, analysis and monitoring and public education and awareness.

3.3.1 Activity: Institutional and regulatory strengthening measures

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A; and to restrict the production and use of the chemicals listed in Annex B. This requires the development of an overarching chemicals management framework. There is no comprehensive and streamlined legislation for chemicals management in the country although some aspects are found in various laws e.g. Pesticides and Toxic Chemicals Act. The successful implementation of the Convention in Trinidad and Tobago would therefore involve the integration of some of these provisions into the current institutional framework.

The action plan (Table 15) aims to strengthen the existing institutional and regulatory framework.

Table 15: Action Plan items for Institutional and Regulatory Strengthening

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					55,000
Enacting local enabling legislation for the Stockholm Convention	Compile and assess existing legal instruments for the life cycle management of POPs (and other hazardous chemicals) in the country	Completed analysis	MPD Ministry of Attorney General and Legal Affairs (AGLA)	1 year	5,000
	Review existing legislations on management of POPs and other hazardous chemicals and waste in selected other countries	Completed review	EMA EPPD PTCCB AGLA	2 years	5,000
	Develop an overall chemical regulatory framework including the assessment of chemicals in use. This can include a national inventory of chemicals (imported, exported, locally manufactured, registered) which identifies chemicals containing POPs and other hazardous properties	Coordinated chemicals management regulatory framework	EMA EPPD PTCCB	1 year	10,000
Develop Coordinating Mechanism for	Form a Committee that will be chaired by PTCCB or MPD. This Committee will	Memorandum of Understandings	PTCCB MPD	1 year and then continuous	5,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
Chemicals and Waste	have over-riding responsibilities for chemicals management	Identified gaps for the coordination Number of meetings	Ministry of Agriculture, Land and Fisheries (MALF)		
Assessing and setting responsibilities of ministries and other relevant agencies for the life cycle management of POPs and other hazardous chemicals (SAICM synergy) and wastes (Basel Convention)	Address gaps and improvement of the frame for life cycle management of POPs and other hazardous chemicals and waste	Completed assessment with recommendations	EPPD EMA SWMCOL WRA THA MALF MoH	1 year	10,000
Established policy and regulatory framework for the use, management and substitution of all products containing POPs	Adopt the Global Harmonised System (GHS) system of labelling to ensure that components in consumer products can be easily identified	GHS system adopted	Consumer Affairs Division CFDD	2 years	20,000

3.3.2 Activity: Measures to reduce or eliminate Releases from Intentional Production and Use

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A; and to restrict the production and use of the chemicals listed in Annex B. There is no production of POPs pesticides or chemicals in Trinidad and Tobago. Mirex-S is the only POPs pesticide which may still be in use in the country from private stocks, but this has not been imported in the last three (3) years. Therefore, no exemption under the Stockholm Convention has been registered.

There are also some old PCB transformers that are coming to the end of their useful life, in addition to PCBs that may be present in existing transformers and capacitors. The regional PCB project under GEF 5558 will assist in identifying these and assist in the process of environmentally sound management of this equipment.

PFOS and related compounds and PBDEs may still be present in existing or expired products and are also present in landfills with associated releases.

Furthermore, recently listed POPs such as SCCPs and DecaBDE, have a range of exemptions which have not yet been assessed for Trinidad and Tobago in the current NIP update. These are likely used in some industrial processes and most likely present and used in articles and products with associated releases.

When the POPs inventories are next conducted, these new POPs would be included and based on their presence, appropriate recommendations would be made.

3.3.3 Activity: Production, Import and Export, Use, Stockpiles, Export and Waste of Annex A POPs Pesticides (Annex A, Part I Chemicals)

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A, but as noted, there are no Annex A Pesticides produced or used in Trinidad and Tobago at this time.

PCP listed in 2015 has not been assessed in this NIP update and therefore there will be need for assessment and control in future. The requisite activities have been included in this action plan.

The following action plan details activities to be undertaken in respect of the production, import and export, use, stockpiles and waste of Annex A Part I pesticides. The major objectives are as follows:

1. Use of environmentally safe pesticides and encouragement of organic farming;
2. Information on health effects due to exposure to pesticides based on occupational monitoring;
3. Improved regulatory framework; and
4. Disposal of hazardous pesticides and empty containers.

The following table (Table 16) summarises the proposed Action Plan for Pesticides.

Table 16: Action Plan for POPs Pesticides

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					900,000
Development of an adequate legislative framework and policy for POPs pesticides	Update the existing regulations to restrict/address all listed pesticides by banning and regulating new/all listed POPs pesticides Assess the need and possible listing of exemptions Develop a regulatory framework for good agricultural practice, pest management and organic farming Develop a regulatory framework for wood treatment and for the management of treated waste wood Develop a regulatory framework for GHS and related labelling	Updated legislation, regulations and list of banned pesticides Subsidiary regulations approved GHS implemented	MoH PTCCB MALF Agricultural Society of Trinidad and Tobago (ASTT) AGLA THA T&TEC	1 year	10,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
	Develop a national Good Agricultural Practices (GAP) policy	GAP Policy developed and implemented	MALF	2 years	15,000
Updated and refined inventory of POPs pesticides	Improve POPs Pesticide inventory possibly considering FAO Pesticide Stockpile Management System (PSMS) (overall pesticide stockpiles; avoiding reoccurrence of obsolete pesticides stocks). Include PCP treated wood and PCP wood treatment sites (link to Dioxin/UPOPs)	Updated pesticides inventory	PTCI	1 year	30,000
Sound Life Cycle Management of POPs Pesticides HHPs	Establish proper POPs/HHPs and waste pesticide storages and securing of storages	Number of sites established	PTCI SWMCOL	3 years	200,000
	Establish an empty containers collection and management system, with specific attention to address the use of pesticides empty containers	Number of containers recycled	MALF	2 years	30,000
	Assess the country's capacity for disposing of obsolete (POPs) pesticides stockpiles and/or considering their export for environmentally sound disposal	Assessment report	MALF PTCCB SWMCOL THA EMA	1 year	15,000
	Dispose of POPs and other waste pesticides stocks	Tonnes disposed	PTCI SWMCOL EMA	3 years	300,000
Education and awareness of stakeholders (policy makers; customs, farmers, NGOs and the public)	Educate policy makers on health hazards of POPs pesticides and HHPs and the benefits of Integrated Pest Management and organic farming	Workshops held	PTCI UTT UWI ASTT MoH	2 years	50,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
			MALF Extension Services		
	Strengthen the inspection capacity on pesticides for customs (including counterfeit and illegal pesticides)	Number of Inspectors trained	PTCI MALF THA Customs and Excise Division	2 years	10,000
	Educate farmers on pesticides, HHPs, counterfeit pesticides, use of integrated pest management, organic farming, ways to reduce and/or eliminate chemicals usage	Number of farmers trained Amount of land used for organic farming	MALF Extension Services PTCI THA	1 year and ongoing	35,000
	Educate citizens and NGOs on POPs pesticides, HHPs, counterfeit pesticides and organic farming and organic products	PA/PE products developed	ASTT MALF	1 year and ongoing	15,000
Established monitoring and analysis of POPs pesticides and HHPs	Monitor occupational exposure to POPs pesticides and HHPs	Number of persons monitored Monitoring reports	MoH OSHA	2 years and ongoing	40,000
	Establish a pesticide monitoring programme (food, soils/contaminated sites, water, consumers)	Sites monitored Monitoring reports	MoH IMA MALF	2 years and ongoing	100,000
	Develop capacity of persons to better assess the risks and socio-economic impact of POPs/ HHPs	Number of persons trained	MoH IMA THA	3 years	50,000

3.3.4 Activity: Production, import and export, use, identification, labelling, removal, storage, and disposal of PCBs and equipment containing PCBs (Annex A, Part II Chemicals)

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A. Any transformers, capacitors, etc. manufactured before 1980 have the potential to be PCB-containing. In Trinidad and Tobago, there is evidence that there are still transformers that contain PCBs and transformers and capacitors in use that are of concern.

The overall objective of the strategy and action plan is to have PCBs-free equipment and materials being used in Trinidad and Tobago. Acknowledging that currently, PCBs are found in electrical devices and that alternatives to these devices are being used in Trinidad and Tobago, the strategy and action plan for eliminating the use of PCB-containing and contaminated equipment should focus on the proper management and phasing-out of this equipment.

While the major focus of this action plan is on the management of PCBs, PCNs are also addressed in this action plan. PCNs have been listed in the Convention in Annex A and C since 2015. PCNs have been used in the same application as PCBs but mainly in the 1930s to 1960s, in closed applications such as in capacitors and less in transformers and hydraulic oils (UNEP, 2017c). PCNs have also been used in the same open applications similar to the use of PCBs (e.g. additives in paints, sealants, rubber, cable sheets, and as metal working fluids). The total production was approximately 150,000 tonnes (10% of global PCB production). Due to the lower use volume and the earlier production/use, industrial PCNs have much lower overall relevance compared to PCBs, and it is unknown if any relevant amount of PCNs are present in the former uses. PCNs can be managed within the frame of PCB management. They are detected by the chlorine test kits for screening of PCBs in transformers and would be integrated in the instrumental screening for chlorine positive samples.

Furthermore, SCCPs have been listed recently as a POP at the Stockholm Convention COP-8 (May 2017), with a range of exemptions. SCCPs have been historically substituted for PCB and PCN in a wide range of open applications (e.g. paints, coatings, sealants, plastic additive/flame retardant, rubber, lubricants, metal working fluids). Since SCCPs and its use in these applications will need to be addressed in the next NIP update, it is necessary that a comprehensive inventory take place together with risk assessments on both electrical devices and other sources, such as open applications, to adequately implement a strategy and action plan for PCB, PCNs and SCCPs.

The proposed activities define specific actions in respect of managing PCBs/PCNs, both in the short and the long term in a manner that is consistent with the obligations of the Stockholm Convention. The overall objective is a reduction and ultimate elimination of PCBs use, the prevention of releases of the chemical into the environment, and the provision for environmentally sound disposal or final elimination of PCBs waste. The strategy and action plan focus on provisions and measures in following areas: legislation, institutional setting, technical capacity, life cycle management, alternatives as well as awareness (Table 17).

Table 17: Action Plan for PCBs

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					380,000
Development and implementation of legislative framework, policy	Assess the performance of regulations in removing and eliminating	Completed Assessment	PTCCB THA AGLA	1 year	10,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
and measures for control and management of PCBs and PCNs in closed and open applications (equipment, materials and wastes)	PCBs/PCNs in use and out of use Strengthen the current legislative framework where needed		MPD		
	Strengthen inspection capacity for PCB/PCN containing equipment still in use	Trained Inspectors	PTCI T&TEC	2 years	30,000
Development/ update of a PCB/PCN inventory in closed and open applications, where necessary	Update the inventory of PCB/PCN containing closed applications (in use and out of use)	Inventory of transformer, capacitors and other equipment	Ministry of Public Utilities (MPU) T&TEC MEEI	2 years	50,000
	Develop and regularly update a database for PCB/PCN containing equipment (in use and storage)	Database	MPU T&TEC	2 years	15,000
	Assessment of PCB, PCN and SCCP in open applications (e.g. sealants, paints, polymers, rubber, industrial oils)	Inventory report	MPD MPU	4 years	75,000
Life cycle management (handling, storage, transport and disposal) of PCBs/PCNs, PCB/PCN-containing equipment, open applications and PCB/PCN containing and contaminated wastes	Assess the current situation and improvement needs of interim storage and disposal facilities for PCB/PCN containing equipment and wastes	Completed assessment with recommendations	MPU T&TEC THA	2 years	50,000
	Develop and implement administrative controls to limit new contaminations (either cross-contamination of PCBs oils and equipment or the environment). The controls should cover such issues as maintenance procedures, monitoring of releases from contaminated sites and remediation of contaminated sites	Guidelines and Controls established and published	SWMCOL T&TEC THA MPD	3 years	20,000
	Develop transport guidelines for in-country	Guidelines developed	MoWT	2 years	15,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
	and trans-boundary movement of PCBs		PTCI Office of Disaster Preparedness and Management EMA		
	Improve existing storage facilities so that they meet the minimum storage conditions for PCBs (and other POPs) materials	Report on improved storage containers Reduced incidents of spillages reported	T&TEC private and public sector	3 years	80,000
Education and awareness of stakeholders (policy makers; customs, related industries, NGOs and the public) on PCBs/PCNs in closed and open applications	Educate policy makers on health hazards of PCBs and PCNs and the related risks for humans, the environment and for food security	Workshops held	MoH	2 years	10,000
	Implement both awareness raising and capacity building/ strengthening (e.g. occupational health and environmental safety) programmes for different target groups. The target groups include the utility companies, the Customs and Excise Division, scrap metal dealers and recyclers, policy and decision makers, media and the general public	Workshops held PA/PE products developed	MPU THA OSHA MPD	2 years	25,000

3.3.5 Activity: Production, Import and Export, Use, Stockpiles, and Wastes of POP-PBDEs (Annex A, Part IV & V Chemicals), HBCD and HBB (Annex A, Part I Chemical)

Article 3 of the SC requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A.

POPs-PBDEs are not produced in Trinidad and Tobago but may still be present in a large number of consumer articles - either still in use or disposed of at the landfill sites. The inventory report for POPs-PBDEs noted that these could be present in CRTs and older end-of-life vehicles. Further, these POPs-PBDEs were probably also present in discarded consumer products such as synthetic carpets and textiles,

amongst others. The amount of POP-PBDEs is considerably higher than the current PBDE inventory given that as of the 2017 COP, DecaBDE, which is present in consumer articles and wastes in considerably higher concentrations, has been listed as a POP.

The action plan focuses on setting actions and measures that will lead to managing and controlling POP-PBDEs containing products (Table 18). For managing POP-PBDEs, the life cycle management (import, export, use, recycling, destruction) of POP-PBDEs containing articles/products and waste needs to be developed, in particular for EEE/WEEE and end of life vehicles. In addition, HBCD and, to a lesser extent, PBDEs are used in insulation of housings (polyurethane and polystyrene). While HBB is no longer produced or used in most countries, it was historically used as a fire-retardant in consumer articles such as cable coatings, lacquers, and PUR foam in auto upholstery.

For such large material and waste flows, resource recovery and recycling should be considered, following the waste management hierarchy for the recovery of resources. However, where feasible, these pollutants, PBDEs, HBCD and HBB, need to be phased out of recycling³. POP-PBDEs might also be partly included in polyurethane or textiles from imported furniture from North America which also needs further assessment.

Table 18: Action Plan for POP-PBDEs, HBCD and HBB

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					890,000
Established regulatory framework for management of POP-BFRs (hazardous chemicals) and related articles and waste categories	Enforce and increase fines in the following: Waste Pollution Rules (WPR), Litter Act, OSHA, CEC Rules Implement Waste Management legislation	Legislation updated	AGLA EMA MPD	1 year	10,000
	Review legislation or regulatory framework to include EEE/WEEE management	Regulatory framework for EEE/WEEE developed (E-Waste policy) Updated legislation	MPU MPD AGLA	2 years	20,000
	Develop deposit schemes and establish recycling centres where the vehicles can be dismantled	Number of recycling centres developed	MPU THA SWMCOL Ministry of Rural Development and Local Government	2 years	50,000

³ Stockholm Convention (2017) Guidance on best available techniques and best environmental practices for the recycling and disposal of articles containing polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on Persistent Organic Pollutants; Draft 2017.

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
Updated and refined inventory of POP-PBDEs (with DecaBDE) and HBCD containing articles and wastes/resources and developed or updated appropriate databases for information management	Update POP-PBDE inventories considering DecaBDE	Updated inventory	MPD SWMCOL THA TTBS	2 years	10,000
Sound Life Cycle Management of POP-PBDE and HBCD product and waste categories (EEE/WEEE, end of life vehicle, insulation foam, and possibly textiles, furniture etc.)	Develop a national e-waste recycling drive to encourage consumers to responsibly dispose of their used electronic waste	Number of items collected and recycled	MPU SWMCOL MPD EMA THA Chamber(s) of Commerce	2 years	150,000
	Develop a system for the sound management for end-of-life vehicles and the POP-BFR containing plastic and other polymers, including cash-back schemes	Number of vehicles dismantled ESM of plastic and polymers within end-of-life management established (Report)	MPU SWMCOL Ministry of Finance or Ministry of Trade and Industries (MTI) Ministry of Works and Transport (MoWT) Regional Corporations	4 years	500,000
Awareness, education and training of major stakeholders on the sound management of POP-BFR containing products and waste within the life cycle management of hazardous substances in EEE, vehicles, buildings, furniture, textiles	Capacity building of authorities and institution for developing and implementing the regulatory framework for life cycle management of EEE, ELVs, construction sector and others Develop procedures on inspections and maintenance of stockpiles and waste	Policy and regulatory needs assessment (report) Training materials developed Procedures on inspections and maintenance	MPD SWMCOL MPU Customs MoWT MTI THA	2 years and ongoing	100,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
	of plastic and other polymers in EEE. Training/education of customs authorities on control of import of WEEE, ELVs and other potentially impacted products.	of stockpiles and waste developed.			
Establishing monitoring of POP-BFRs and pollutants in affected environments	Design a Health Screening Programme in high-risk communities to monitor the health of persons in these communities. <i>It is important to do this for pregnant women and elderly persons</i> Monitor persons identified in this programme	Health Screening Programme developed Number of persons screened Screening reports	IMA CFDD MoH THA WRAWASA	2 years and ongoing	50,000
	Implement a testing regime of water ways and marine life. This would include identification of causes of downstream effects, testing of sediments, fish, oysters, etc. for any trace of POPs, toxicity of mangrove nursery	Fully implemented marine testing programme			

3.3.6 Activity: Production, import and export, use, stockpiles and wastes of DDT (Annex B Chemicals) (if Used in the Country)

As noted in Section 2.3.5, DDT has been delisted by the PTCCB, and the ban is generally effective.

3.3.7 Activity: Production, import and export, use, stockpiles and wastes of PFOS, its salts and PFOS-F (Annex B, Part III Chemicals)

According to the inventory report, PFOS and related substances are not manufactured in Trinidad and Tobago, however, PFOS and related substances have entered the country in consumer products and articles.

PFOS related substances, such as Mirex-S, were used as insecticides against ants but have now been replaced by alternatives. PFOS is usually widely found in fire-fighting foams, and there are likely stocks at the Fire Services Division and at private companies. In the country, synthetic carpets (tufted carpets) are widely used and these most probably contain PFOS related substances.

Currently, there is no monitoring capacity to assess contaminated sites or potentially PFOS containing products.

PFOS and related substances have been substituted mainly by other per- and polyfluorinated substances (PFAS) in the manufacture of products. Under the Strategic Approach of Chemical Management (SAICM), PFAS have been flagged as an issue of concern. To promote the synergy of the Stockholm Convention and SAICM, the action plan is extended to consider other PFAS substances where appropriate.

The main issues to be considered in the action plan (Table 19) are contaminated sites and ground water. Also, the identification, management, safe handling and treatment of consumer products and waste potentially containing PFOS and PFAS should be addressed.

Table 19: Action Plan for PFOS and Related Substances

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					360,000
Established policy and regulatory framework for the use, management and substitution of PFOS and related substances in industrial uses and in products and waste	Update the negative list, thus restricting items (material/ goods/ procurement) that may contain PFOS	Updated negative list	Customs MTI	1 year	5,000
	Implement a testing regime for consumer products for PFOS and associated compounds	Number of products tested	Consumer Affairs Division CFDD	2 years and continuous	50,000
	Set criteria for determining contaminated sites and clean-up procedures (general activity on contaminated site framework)	Criteria developed	EMA MPD-EPPD SWMCOL THA	2 years	20,000
Updated and refined inventory of PFOS and other PFAS use and containing articles and wastes and developed/ updated databases for information management	Refine inventory of PFOS and other PFAS in firefighting foams.	Stakeholders identified	Fire Service Division	1 year	20,000
	Refine inventory of PFOS and other PFAS in consumer products (e.g. treated synthetic carpets, furniture, paper)	Updated Inventory	SWMCOL EMA THA Consumer Affairs Division TTMA		
	Refine inventory of stocks and waste of PFOS and other				

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
	PFAS (including landfills) Refine inventory of historic use and release of PFOS and PFAS (see contaminated site action plan)				
Life cycle management of PFOS and other PFAS in priority areas and prevention of PFOS and PFAS from entering the waterways	Establish proper storage for firefighting foam	Storage sites identified and established	Fire Services Division Private Sector OSHA	2 years	100,000
	Dispose expired and used firefighting foam in an environmentally sound manner	Tonnes of foam disposed	SWMCOL TTEMAS Fire Services Petrotrin Airports Authority of Trinidad and Tobago (AATT)	3 years	100,000
	Regularly testing of landfills for PFOS and related compounds	Test reports	SWMCOL THA Municipal Corporations	Continuous , twice a year minimum	50,000
Training and awareness raising for stakeholder groups on PFOS and establishing approach for information exchange	Develop targeted public awareness interventions for persons who dispose of products that may contain PFOS or PFAS with suggested disposal options	Number of persons targeted	TTEMAS Fire Services Division EMA	2 years	10,000
	Develop database with public access to products that potentially contain PFOS or PFAS	Database developed	TTBS Consumer Affairs Division	2 years	5,000

3.3.8 Activity: Register for specific exemptions and the continuing need for exemptions (Article 4)

Article 4 of the SC requires the establishment of a POPs register for the purpose of identifying parties that have specific exemptions listed in Annex A or B. All registrations of specific exemptions are subject to periodic review. The listed POPs with specific exemptions and acceptable purposes have increased, and meanwhile, ten (10) POPs have been listed with exemptions (HBCD, DecaBDE, SCCP, PCNs, PFOS, DDT, Technical Endosulfan and related isomers, Lindane, PCP and recycling of PBDEs). To decide if an exemption is needed, an informed decision needs to be made considering alternative chemicals and non-chemical solutions. Such an assessment is made by appropriate technical/research institutions and committees. If after such a scientific assessment an exemption is needed, then the Secretariat of the Stockholm Convention/ COP would be informed and the exemption registered. Therefore, in this action plan, an activity is included to establish an appropriate systematic methodology to determine if an exemption is needed to appropriately meet the obligations under Article 4 in future (see Table 20).

Table 20: Register for specific exemptions and continuing need for exemptions (Article 4)

Objectives	Activities	Indicator	Responsibility	Time Frame	Budget US\$
					25,000
To establish an informed registration process for needed exemptions	Organize stakeholder consultation to establish criteria for assessment and selection of exemptions for chemicals listed under Annex A/B	Stakeholder consultation held and outcomes documented	MPD	3 years	10,000
	Assess if exemptions are needed for HBCD, DecaBDE, SCCP and future listed PFOA	Country assessment of current listed POPs with exemptions (report)			5,000
If for a certain POP exemption is needed, it would be described in this activity	Inform Secretariat of the Stockholm Convention/ COP on the exemption needed after thorough assessment of the need and the alternative options	Notification submitted and exemption listed	MPD Affected stakeholders (e.g. Fire Services or PTCCB)	As need arises	10,000
	Periodic review to assess the need for continued exemptions and alternatives and stop exemption and use more sustainable alternatives as soon as feasible	Review report		As need arises	

3.3.9 Activity: Measures to reduce releases from unintentional production (UPOPs) (Article 5)

Based on the inventory data, for the year 2016, the estimated total release of UPOPs (PCDD/F) for Trinidad and Tobago was found to be 23 g TEQ/year (BCRC-Caribbean, 2017e). The major sources of release to the environment were Ferrous and Non-Ferrous Metal Production (*primarily through thermal wire reclamation*), open burning processes (*such as landfill and other fires*) and waste incinerators.

Activities are proposed for the action plan (Table 21) to reduce the release of UPOPs (PCDD/PCDFs, PCBs, PeCBz and HCB) in Trinidad and Tobago. In the action plan, the activities have been set by considering the listing of the priority sources in Annex C of the SC, the total amount of contemporary releases as an outcome of the inventory process and point sources with potential risks to humans. The strategy and action plan seek to focus on provisions and measures in the following areas:

- (a) Improving waste management – This can include source separation, the ESM and disposal of POPs containing wastes. The improvement of waste management will have the largest effect on the reduction of dioxin/UPOPs releases but also other related releases like particulate matter (PM), PAHs and carbon black, and therefore is of crucial importance to avoid threats posed to the nation's air and soil integrity. Trinidad and Tobago has drafted waste management legislation. Implementation of this legislation, together with effective regulating and monitoring of waste disposal sites, would greatly assist in the reduction of poor waste management practices such as illegal dumping and open burning of waste.
- (b) Monitoring and analysis - There has been no monitoring of UPOPs in Trinidad and Tobago. However, with the implementation of the Air Pollution Rules, 2014, which includes UPOPs (dioxins, furans) as parameters to be regulated, activities/facilities that generate emissions with these pollutants will be required to monitor as part of the Source Emitter Registration and Air Pollution Permitting processes. Monitoring can also be considered for:
 - (i) **contaminated sites** – Historically, the largest amount of PCCD/PCDF releases are from contaminated sites, including landfills, soils or sediments. The potentially contaminated identified in the UPOPs inventory will need further assessment to determine their contamination level and possible impact on the environment and risk of human exposure. Any future assessment of UPOPs-contaminated sites should be included in the larger framework of contaminated-site assessment and POPs monitoring in the country;
 - (ii) **vulnerable communities that exist in close proximity to disposal sites** – A monitoring regime can be implemented, similar to the already established UNEP/WHO Global Milk Survey (2013), which has been undertaken in several other Caribbean countries;
 - (iii) **food and waterways** – would require reliable analytical tools;

(c) Reduction of Fires

Open burning and thermal reclamation of copper are the two main producers of UPOPs in Trinidad and Tobago. In addition to the legal framework (the Agricultural Fires Act Ch63:02, Act 20 of 1965), the country needs to increase fines for illegal fires and also increase enforcement through fire wardens. This would include assessing the present situation regarding open burning (such as for land clearance and disposal of agricultural waste). A high degree of public awareness would be involved including ensuring that people understand the risks of burning co-mingled household garbage and the setting of bush and forest fires.

(d) Updating and refining the UPOPs inventory

In the further implementation of the SC, the UPOPs-inventory will be updated. In this process, all the relevant stakeholders and potential sources of UPOPs need to be addressed. Mechanisms for self-reporting should also be explored using existing mechanisms such as those used for reporting required

under the Air Pollution Rules, 2014. While this would not capture all sources; it would work towards refining the inventory and making more information available to the decision makers.

Table 21: Action Plan for UPOPs reduction

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					1,095,000
To establish policy and legal framework for reduction and minimization of UPOPs	Provide tax incentives for companies that provide third party recycling services	Number of companies involved in recycling	Ministry of Finance MPU	3 years	15,000
	Increase fines for illegal burning and enforce the fines	Reduction in fires reported	Fire Services Division AGLA	1 year	5,000
Reduction and minimization of UPOPs releases from medical waste incinerators	Educate operators and competent authorities on minimizing Dioxin/UPOPs releases and emission controls Strengthen institutional and human resource capabilities to implement environmentally sound medical waste management Ensure that all waste incinerators apply for Source Emitter Registration under the Air Pollution Rules, 2014 Select and implement sound treatment of medical waste including non-incineration technologies (WHO guideline)	Institutions and staff trained UPOPs releases from waste incinerators minimized Number of permits approved Non-incineration technology assessed and possibly used	EMA MoH Regional Health Authorities (RHAs) Hospitals Private Sector	5 years	75,000
Updated sources inventories for PCDD/F and other listed UPOPs and data appropriately	Refine Dioxin/UPOPs inventories	Updated inventory Stakeholder listing updated	MPD/EPPD, THA, EMA	1 year	20,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
managed and harmonized with other release inventories	Update of UPOPs inventory annually	Biennial updates	MPD/EPPD, THA, EMA	Continuous	30,000
Awareness raising and education	Develop PA/PE programmes for industries and affected neighbouring communities by using social media platforms. Get creative to grasp the attention of the public such as involving local celebrities	Media developed	EMA THA	2 years	150,000
	Establish outreach programme for vulnerable communities such as developments and villages in close proximity to landfill/ dumping sites and close to rivers and other water courses	Outreach programme Number of meetings	EMA THA SWMCOL MPU Ministry of Community Development	2 years	50,000
	Develop public campaigns to reduce and restrict the burning of household waste including radio/television advertisements and interviews. Social media platforms should be used and government programs highlighted. This content should cater for all age groups to grasp the attention of the general public. Special consideration should be given to grassroots communities and those with limited internet access Mobile applications can be developed to identify dumps and landfill sites	Number of fires reported	Fire Services EMA THA SWMCOL MPU Municipal Corporations	2 years	50,000

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
	for proper disposal of waste by the public				
Reduce UPOPs by substitution of chemicals and materials responsible for release	Develop standards for chemicals and consumer products so that products that contain POPs and may produce UPOPs are restricted	Standards sent for public comment and finalised	TTBS Consumer Affairs Division	2 years	50,000
	Identify the use of chemicals associated with the chlorine cycle considering the Toolkit guidance ⁴ and evaluate their release of UPOPs (e.g. PVC production/use, chlorine in industries and water treatment, pesticides/pigments containing UPOPs or resulting in UPOPs potential release)	List developed	MEEI WRAWASA MPD/EPPD	2 years	10,000
	Identify and promote feasible and affordable alternatives to chemicals and materials contributing to UPOPs release	Listing developed and published	MEEI MPD/EPPD TTBS PTCI	1 year	10,000
Establish monitoring of PCDD/F and other UPOPs and relevant pollutants from Annex C, Parts II and III sources and human exposure	Establish continuous marine monitoring which would include sediment, benthic and water quality (include POPs as part of the monitoring parameters)	Monitoring reports	IMA	2 years and continuous	300,000
	Improve testing regime by the Ministry of Health of local and foreign food products for POPs	Testing reports	MoH	1 year and continuous	100,000

⁴UNEP Toolkit (2013) Annex 2 Guidance on Identifying Sources of PCDD/PCDF.
http://toolkit.pops.int/Publish/Annexes/A_02_Annex02.html

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
	Examine health trends especially for vulnerable communities	Reports	MoH THA	1 year and continuous	100,000
	Develop testing regime for animals for POPs	Number of animals tested Testing records	MoH Veterinary Association MALF	1 year and continuous	100,000
	Ensure that fire wardens are employed, especially during the dry season, to ensure that all unpermitted fires are reported	Number of wardens employed	Fire Services Division Municipal Corporations MALF	1 year and continuous	30,000

3.3.10 Activity: Identification and management of stockpiles, waste and articles in use, including reduction of releases and appropriate measures for handling and disposal (Article 6)

Toxic releases from stockpiles and waste constitute a serious threat to human health and the environment. This calls for their safe, efficient and environmentally sound management. Activities geared towards the development of appropriate strategies and measures to stem releases through actions such as proper handling, collection, transport and disposal of such stockpiles and wastes are outlined below and in the action plans for the individual POPs above.

Even though no stockpiles of POPs pesticides were identified, there are still items and wastes that contain PCBs/PCNs and POP-BFRs. These items include WEEE plastic; plastic/polymers of end of life vehicles; and insulation foam from construction. Additionally, there would be PFOS and related substances (PFOS precursors) found in stockpiles such as carpets, textiles and firefighting foams.

Wastes containing these POPs chemicals need to be managed. Activities for the management of POPs-specific wastes are listed in the individual action plans and would be considered/linked to the activities listed in this generic action plan for POPs stockpiles (see Table 22).

The overall goal is to develop and implement a programme to manage the stockpiles/wastes and reduce releases from stockpiles and waste in accordance with internationally accepted guidelines and practises for handling, storage, transportation, and final disposal.

Table 22: Action Plan to reduce releases from Stockpiles and Wastes (Article 6)

Objectives	Activities	Indicator	Responsibility	Time	Budget US\$
<i>(Please note: The management of the stockpiles of the individual POPs (PCBs, pesticides, PFOS, POP-PBDEs, HBCD) is included in the action plans of individual POPs above).</i>					200,000
Identification of options and limitations for the destruction and management of POPs and hazardous chemicals in the country and the current and future capacity needs and options	Evaluation of the option and limitation of destruction capacity of waste (chemicals and chemicals in products) in the country and the region	Documentation on destruction capacity	SWMCOL MPD PTCI EMA MALF MPU	3 years	15,000
	Evaluation of the option and limitation of other ESM measures for POPs containing wastes and chemicals and chemicals in products in country	Documentation of other ESM options in the country			
	Needs assessment for improvement of management and destruction capacity	Needs assessment report			
Developing measures for safe handling, separation and sound disposal of stockpiles of chemicals and articles in use and appropriately recovering resources and energy to move to a more circular economy	Develop manuals for safe handling and disposal Develop guidelines for the transport of POPs wastes Establish a collection scheme for POPs containing articles Establish appropriate separation, recycling and energy recovery schemes for POPs containing wastes	Manuals for safe handling and disposal Guidelines on transport Collections scheme for POPs containing products and wastes Separation schemes for waste fractions like e-waste, end of life vehicles, waste wood or waste oils	SWMCOL MPU MoWT	5 years	50,000
Store POPs stockpiles and hazardous chemicals and wastes in a safe and environmentally sound manner	Identify appropriate storage facilities for interim storage of stockpiles	Guidelines for safe storage Selected storage for stockpiles were identified	SWMCOL MPD PTCI MALF	3 years	35,000
	Upgrade existing information for safe management of stockpiles	Workshops to train personnel			

Objectives	Activities	Indicator	Responsibility	Time	Budget US\$
		in management of stockpiles			
Destruction, disposal or export of POPs wastes and other hazardous chemicals and waste in an ESM	Destruction of POPs containing waste and other hazardous chemicals containing waste in an ESM Possible disposal of selected POPs containing waste fractions with low leaching risk	POPs and other hazardous chemical waste (including hazardous chemicals in products) managed in ESM	SWMCOL PTCI MALF	5 years	100,000
	Identification and export of POPs and other hazardous chemical waste which cannot be treated or disposed in the country	Completed listing and location of POPs and hazardous chemicals waste			

3.3.11 Activity: Identification of Contaminated Sites (Annex A, B, and C Chemicals) and, Where Feasible, Remediation of Identified Sites in an Environmentally Sound Manner

Article 6 of the SC requires Parties to endeavour to develop appropriate strategies for identifying sites contaminated by chemicals listed in Annexes A, B or C. For all the POPs inventories conducted for 2016, potentially contaminated sites were identified. These sites included all the identified waste disposal sites, sites where POPs had been previously used, former storage sites of POPs pesticides and sites where PCB transformers were located. Trinidad and Tobago would need to develop guidelines for the identification and assessment of contaminated sites (UNIDO, 2016). Once these sites have been identified and prioritised, remediation plans would need to be developed for them and further funding sought for the remediation actions. For the identified sites, monitoring of environmental parameters is required to determine the extent of contamination on-site as well as the effects on the neighbouring communities. These actions are described in Table 23 below.

Table 23: Action Plan for Contaminated Sites

Objectives	Activities	Indicators	Responsibility	Time Frame	Budget US\$
					825,000
Regulatory Framework for contaminated sites established	Develop guidelines to set criteria for determining contaminated sites for relevant POPs	Guidelines developed on contaminated sites and soils	MPD-EPDD EMA THA SWMCOL	5 years	5,000
	Legislation on liability related to contamination and	Draft legislation on liability for contamination and	MoH	3 years	5,000

Objectives	Activities	Indicators	Responsibility	Time Frame	Budget US\$
	clean-up procedures (Polluter Pays Principle (PPP))	clean-up procedures	WRA Fire Services AGLA		
	Establish guidelines for soil and ground water assessment and limits	Guidelines established		5 years	10,000
Methodology to identify, assess and prioritize sites contaminated with Annex A, B and C chemicals	Develop methodology to identify, assess and prioritize POPs contaminated sites considering available guidance documents	General procedures for investigations developed (report)	MPD-EPDD EMA THA SWMCOL MoH	3 years	15,000
	Establish methodology for groundwater and soil assessment	Methodology (guidance)	WRA, WASA	3 year	10,000
	Develop list of potentially contaminated sites	List compiled (considering individual POP groups)	MALF Caroni (1975) Ltd	2 years	5,000
	(Preliminary) prioritization of POPs contaminated sites	List of priority sites	PTCCB THA SWMCOL EMA	2 years	5,000
	Participate in or to follow the UNEP working group on POPs contaminated sites	Expert nominated for contact/ participation in the UNEP BAT/BEP group	MPD-EPPD	1 years	5,000
Secure POPs contaminated sites, and where feasible, develop remediation plans for contaminated sites	Standard procedures for registering and securing contaminated sites	Procedures for securing contaminated sites identified and isolated	SWMCOL THA WASA/WRA EMA	5-10 years	15,000
	Identify the level of contamination of soil and ground water and potential receptors and exposure risk	Number of site assessments completed and reported	MoH		250,000
	Identify potential remediation technologies available Develop strategies for the environmentally sound management of	Compilation and selection of available environmentally sound remediation methods (report)			30,000

Objectives	Activities	Indicators	Responsibility	Time Frame	Budget US\$
	POPs contaminated sites	Draft guidelines on clean up procedures			
	Train and upgrade skills of personnel in the assessment, securing and remediation of contaminated sites	Training of staff on contaminated sites; contaminated site expert in governmental institution			50,000
	Develop for each site a tailor-made site clean-up plan	Number of remediation plans completed and reported			350,000
Countrywide database for POPs contaminated sites considering relevant co-pollutants	Assessment of database systems for contaminated sites in other countries Selection of database approach and establishing POPs contaminated site database considering co-pollutants integrated in a general contaminated site database	Report on database (with recommendation) Database selected and established	THA, SWMCOL, EMA	5 years	70,000

3.3.12 Activity: Facilitation or Undertaking of Information Exchange and Stakeholder Participation

Under Article 9 of the SC, Trinidad and Tobago has a responsibility to facilitate the exchange of information related to:

- Reducing or eliminating the production, use and release of persistent organic pollutants (POPs);
- Alternatives to POPs, including information relating to their risk as well as to their economic and social costs.

This section discusses and makes recommendations pertaining to the exchange of information between Trinidad and Tobago and other Parties to the Stockholm Convention. Information and recommendations on the provision of information to the general public will be addressed in Section 3.3.13 as well as in all the individual POPs action plans that were previously discussed.

It is not clear how much information on reduction/elimination of and alternatives to POPs is presently available in Trinidad and Tobago, but in 2011 it was noted that information exchange was done on an ad hoc basis (Sammy and McCalla, 2011). They recommended that the system for requesting information on reduction or elimination of POPs and alternatives to POPs should be formalized.

The formal system envisaged by Sammy and McCalla would require the development of a database of citations for such information. This would be used to respond to questions from other Parties to the Stockholm Convention, and may be extended to include information requests from industries, research

organizations and government agencies; both local and international. It would be cost effective to develop a single database relative to POPs as well as hazardous chemicals and pesticides covered by the Rotterdam Convention.

The following comments relate to the establishment of the database described above:

- The EPPD of the MPD appears to be the appropriate organization to develop and maintain this database.
- The database would consist of citations of sources, information on and links to relevant websites (as appropriate) and a listing of the type of information each document contains.
- The database should clearly flag information, which is not in the public domain, with a notation that such information must be requested and released directly by its owner.

If this database is established online, persons requesting information can review it themselves and contact the owners of documents directly to request copies of the full documents. If the database is not available online, the designated officer of the EPPD will have to review it on behalf of the person making the request and respond with a listing of relevant documents. The person making the request can then contact the owners of documents to request copies of the full documents. In this latter case, consideration may be given to charging an administrative fee (Table 24).

Table 24: Action Plan for facilitating Information Exchange and Stakeholder Participation

Objectives	Activities	Indicator	Responsibility	Time
Information exchange on POPs in the region and internationally	Development of a mechanism through which information generated by the Stockholm, Basel and Rotterdam Secretariat and SAICM Secretariat is received by the country and its stakeholders Develop a mechanism through which information on POPs from the country with regional or international relevance are communicated to the regional Basel and/or Stockholm centres and to the Basel, Rotterdam, Stockholm Secretariat	Information exchange on POPs in the region and internationally is ensured	MPD Regional stakeholders	3 years
Access of information and documents for national stakeholders	Establish a mechanism and possibly a website where key documents, information and news on POPs and hazardous chemicals can be found by stakeholders Evaluation of the Stockholm Convention documents	Key documents and information accessible to stakeholders	MPD EMA	3 years

Improved information exchange on a national level between stakeholders	Facilitate the dialogue between industry, research and policy makers Establish or improve dialogue between the science community and policy makers for improved science-policy dialogue	Information exchange on a national level between stakeholders take place	MPD EMA	3 years
---	--	--	------------	---------

3.3.13 Activity: Public awareness, information and education

Article 10 of the SC on awareness, information and education, requires Parties to promote and facilitate awareness among policy and decision makers with regard to POPs. Parties should ensure that all available information on POPs is made available to the public and the information is kept up to date. In pursuance of this article, Parties should ensure that appropriate educational programmes are put in place for groups such as women, children and the least educated, as well as for workers, scientists, educators and technical and managerial personnel.

The successful implementation of the SC on POPs in the country will only be achieved when the relevant stakeholders (policy makers, industry, science community, civil society and general population) are sensitised on the nature of POPs, other hazardous chemicals and their effects on human health and the environment. By an appropriate awareness of stakeholders, the needed commitment is reached for the achievement of the Convention's objective. It is therefore important for action to be directed at promoting the ongoing and detailed awareness, information and training programmes on POPs and hazardous chemicals in products and in the life cycle (SAICM synergy). Information needs to be individually developed and targeted for specific stakeholder groups including policy and decision makers, industry as well as the general public. The individual stakeholders should be trained to be appropriately informed to play their respective roles.

The awareness activities will be linked to general awareness activities on chemical safety, awareness programmes on public health, and on green economic development, as well as awareness programmes on sustainable consumption and production - all aimed at broad awareness raising strategies for sustainable development.

Section 2.3.10 summarises the previous public education and awareness activities in Trinidad and Tobago. This included the development and advertising of a POPs advertisement, industry magazine articles on POPs and PCBs, and information booklets and brochures. The previous copy of the NIP was also widely distributed. Through all the stakeholder meetings, it has been highlighted that targeted campaigns are required for the specific audience. The use of social media was particularly discussed as this is widely accessible and used in Trinidad and Tobago.

A range of suggested awareness activities have been included in the individual action plans of this NIP for pesticides, PCBs, UPOPs, and new industrial POPs (POP-BFRs and PFOS). These activities will be coordinated and addressed collectively where appropriate. In this section, general activities on awareness of POPs and hazardous chemicals are compiled. Table 25 shows the general education action items recommended.

Table 25: Action plan for public awareness, information and education

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					75,000
Improve Education	Revise current curriculum content in schools to educate students about POPs and the dangers and risks involved	Curricula updated	Ministry of Education	3 years	45,000
General Awareness on POPs and on POPs-related SAICM issues and general hazardous chemicals, as appropriate <i>(For specific awareness activities for individual POPs see the respective action plans of individual POPs and coordinate)</i>	Compile available state of the art awareness and education materials on POPs and other hazardous chemicals and GHS	Awareness and education materials on POPs and other hazardous chemicals and GHS compiled	MPD	3 years	10,000
	Implement trainings and programs for teachers and lecturers about toxicology, environment and ecology issues related to POPs and hazardous and green/sustainable chemicals	Trainings and workshops conducted (number of participants)	MPD Ministry of Education UWI UTT	3 years	20,000

3.3.14 Activity: Effectiveness evaluation

Article 16 of the SC requires parties to establish mechanisms for providing comparable monitoring data on the presence of Annex A, B and C chemicals. Parties, in accordance with their technical and financial capabilities and using existing monitoring programmes and mechanisms (where possible), are to co-operate on a regional basis, when appropriate, and contribute to a global monitoring programme for the SC. This evaluation shall be conducted on the basis of available scientific, environmental, technical and economic information including national reports. As main matrices selected for assessment of the effectiveness of the implementation, human health screening and food screening have been identified. From a regional perspective, UNEP, together with WHO and the Stockholm Convention Secretariat, are conducting and supporting human milk surveys in developing countries (UNEP/WHO, 2013). While Trinidad and Tobago has not participated in the past, this is worth pursuing (see Table 26).

Table 26: Effectiveness evaluation (Article 16)

Objectives	Activities	Indicators	Responsibility	Time	Budget US\$
					60,000
Conduct monitoring of POPs in human milk or human blood	Conduct monitoring of POPs in human milk	Data/report on POPs in human milk or blood	MoH	3 years	50,000

Objectives	Activities	Indicators	Responsibility	Time	Budget US\$
	or human blood				
Evaluate the effectiveness of the implementation of the Convention by other approaches	Develop an evaluation framework Assess other performance criteria options Develop further national performance evaluation criteria	Evaluation programme prepared Assessment report on other options Criteria Developed	MPD	6 years	10,000

Evaluation of the NIP

Within six (6) weeks of the end of each year of the NIP, the EPPD can review the Action Items for the preceding year in the NIP and report on progress in implementation. For each Action, this report could also indicate whether the Action was completed, and if not:

- Reasons for non-completion;
- Actions and resources to ensure completion in the next year of the NIP.

The report can then be forwarded to the Permanent Secretary of the Ministry with responsibility for the Environment (currently the MPD) to be forwarded to the Minister for decisions and actions.

3.3.15 Activity: Reporting

According to Article 15, Parties are required to report periodically on the measures taken, and on their effectiveness in meeting the objectives of the SC. This article mandates Parties to report to the Conference of Parties (COP) on measures taken to implement the provisions of the Convention as well as the effectiveness of the measures taken. In addition, each Party is to provide to the Secretariat, statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and B as well as a list of states from/to which it has imported/exported each of such substances. The Article 15 reports provide a substantial input to the effectiveness evaluation of the Convention (Article 16) and are submitted every four (4) years.

Other notifications and reports required under the Stockholm Convention include:

- Proposing the listing of chemicals in Annexes A, B or C;
- Registering specific exemptions to the Lists in Annexes A and B;
- Statistical Data on production, import and export of the chemicals listed in Annexes A or B.

These are detailed in Table 27 below.

Table 27: Action Plan for Reporting under Article 15 of the Stockholm Convention

Objectives	Activities	Indicator	Responsibility	Time	Budget US \$
					15,000
Setting up mechanism for article 15 reporting	Setting up responsibilities for data compilation and completing the reporting form	Form filled	MPD	1 year (for 2018 reporting)	5,000
Complying with article 15 reporting	Compile information for reporting (updated inventory and other information) Submit report to the Secretariat (website)	Reporting submitted Deadlines met	MPD	6 months (reporting 2018; then every 4-year)	10,000

3.3.15.1 Registering chemicals and exemptions

To date, Trinidad and Tobago has not proposed the listing of any chemicals under the Stockholm Convention, nor did the country register any specific exemptions on becoming a Party to the Convention under Article 4:3.

Should Trinidad and Tobago wish to propose the listing of any chemicals, a Notification will be prepared and submitted by the EPPD of the MPD. It is to be noted that decisions concerning the listing of chemicals in Annexes A or B, invoking exemptions or extending exemptions in Annexes A or B would require information on current use of those chemicals in Trinidad and Tobago, whether practical alternatives are available, and the time required for change-over to the alternative. Financial implications of the change-over and environmental and human health implications of delaying the change-over must also be considered (Sammy and McCalla, 2011).

In determining the need for any of those actions, the EPPD should consult a wide range of stakeholders, including the:

- Pesticides and Toxic Chemicals Control Board/PTCI.
- Environmental Management Authority.
- Ministry of Agriculture, Land and Fisheries
- Ministry of Energy and Energy Industries
- Tobago House of Assembly.
- Trinidad and Tobago Bureau of Standards.
- Caribbean Industrial Research Institute.
- University of the West Indies (St. Augustine).
- University of Trinidad and Tobago.
- Farming Community.
- Petroleum Industry.
- Construction Industry.
- Other Manufacturing Industries.

The Notification Procedure would be as follows:

- The PTCCB decides to consider listing a chemical, requesting an exemption or continuing an exemption, either based on a suggestion from a government agency, industry stakeholder, research institute or private citizen; or on their own volition.
- Within one (1) month of a decision, the PTCCB assembles a position paper and circulates to key stakeholders for comment.
- Stakeholders will be given three (3) months to comment on the position paper. This may be extended at the discretion of the PTCCB.
- The position paper will be amended based on responses from stakeholders and submitted to the Minister with responsibility for Health within six (6) months of the initial decision.

After due consideration, the Minister will either accept or reject the position paper. If the position paper is accepted, the Head of the Ministry responsible for Environment will be instructed to forward the recommendation to the Stockholm Convention Secretariat.

3.3.16 Activity: Research, Development and Monitoring

Article 11 of the SC mandates Parties, within their capabilities, to undertake research, development and monitoring at the national and international levels.

Two (2) universities in Trinidad and Tobago have undertaken studies to determine levels of contamination by POPs. Additionally, recommendations have been made to conduct human health and food screening. Also, there are recommendations to improve the capability of the local laboratories to test for POPs. These are discussed in the individual action plans for the POPs.

3.3.17 Activity: Technical and Financial Assistance

The ability of the country to fulfil its obligations under the POPs Convention depends partly on the provision of adequate financial and technical assistance. Trinidad and Tobago will need to seek technical and financial assistance when implementing its NIP.

3.3.17.1 Technical Assistance

Through the extensive stakeholders meeting held for the NIP update process, several areas of technical assistance were discussed. These included:

- Use of less harmful chemicals in agriculture and introduction of organic farming;
- Use of alternative chemicals to reduce the production of UPOPs; and
- Testing of consumer products to determine if they contain POPs such as PFOS.

3.3.17.2 Financial Assistance

Financing will be required for all of the studies listed in this NIP including all the recommended inventory updates. Financing would also be required for infrastructure such as laboratory improvements and contaminated sites remediation. Considerations on financing are compiled below in Chapter 3.6: Resource requirements.

3.4 Development and Capacity-building Proposals and Priorities

Items of capacity-building envisaged under this NIP are outlined in Table 28 below. Some of these items include:

- Additional Staff at the Pesticides and Toxic Chemicals Inspectorate;
- Developing Laboratory Testing Capability to cover all POPs;
- Training of a cadre of professionals in POPs including data-gathering and management.

Table 28: Action plan for capacity building

Objective	Activities	Indicator	Responsibility	Time	Budget US\$
					480,000
Capacity Development of the PTCI	Improve the capacity of the Pesticides and Toxic Chemicals Inspectorate so that toxic chemicals can also be managed effectively. This would also include POPs	Increased staff levels	PTCCB MALF PTCI	2 years then continuous	200,000
Capacity Development for Laboratories	Equip laboratories of Chemistry, Food and Drugs to test for POPs and/or associated chemicals	Testing capability available for POPs	CFDD	3 years	250,000
Capacity Building for Agencies	Develop technical capacity of institutions for life cycle management of POPs, chemicals and waste	Number of Training Workshops	EPPD EMA SWMCOL WRA THA MALF MoH	2 years	30,000

3.5 Timetable for Plan Implementation and Measures of Success

The individual action plans and activities developed and compiled in chapter 3.3 contain time frames for implementation of the stated activities. Time frames are short-term (1 year), medium-term (3 to 5 years) and long-term (5 to 7 years).

3.6 Resource Requirements

Resources required to implement this NIP are summarized in Table 29, along with an indication of the availability of such resources.

Table 29: Resources and Availability

No.	RESOURCE	AVAILABILITY
1	Legal Drafting Capability	Such capability appears to be available locally and within the Region.
2	Laboratory Testing Capability	Full capability does not currently exist. Recommendations for filling this gap are found in Section 3.4.
3	Capability to update the POPs Inventory	Basic capability appears to be available locally, but further training is suggested in Section 3.4.
4	Capability to Sample and Test Leachate	Sampling capability and some testing capability appears to be available locally. Some tests may have to be done abroad.
5	Capability to Sample Air and Test for UPOPs	Basic sampling capability and some testing capability appears to be available locally. Some filters will have to be imported, and some tests may have to be done abroad.
6	Capability to conduct Investigations of suspected Contaminated Sites	Such capability appears to be available locally.
7	Capability to conduct Public Awareness Campaign	Such capability appears to be available locally.
8	Additional Staffing for the PTCI	There appears to be a number of graduates in Chemistry and related fields presently seeking employment. In addition, requests can be made for UN Volunteers as a short-term measure (up to 2 years) until posts can be established within the Public Service.

An estimate of resource requirements of the respective activities is included in the action plan tables presented above. Financial resources from the GEF and other international sources of funding may not sufficiently cover the full implementation costs of the activities proposed; hence, co-funding has to be considered. Therefore, potential sources of funding have to be identified. The Green Fund can be accessed for activities that cover contaminated sites. The implementing agencies for this NIP should take maximum advantage of the financial resources allocated by international financial organizations and other countries by conducting appropriate campaigns to attract capital from donors for National Planning, creating a legal basis for encouraging international sponsorship, etc.

In addition to international financing, the GORTT should ensure that necessary resources are made available, locally. The GORTT should create a legal basis and favourable conditions to encourage and attract the participation of all related economic sectors, domestic and foreign organizations, as well as investors for the implementation of the NIP. These include financial incentives, increases in fines where necessary, ensuring that the legislative framework for chemicals management is in place, establishing extended producer responsibility (EPR) and ensuring that agencies are adequately staffed and equipped.

The NIP should be coordinated and integrated, where appropriate, with other related national plans and programmes on waste and chemicals management, resources management, sustainable development and

climate change in order to attract investment and increase capital efficiency. By linking to general chemical and waste management, co-funding can partly come from national budgets dedicated to chemicals and in particular, to waste management.

One important source for financing the management of wastes and stockpiles is the extended producer responsibility approach. For several waste fractions related to POPs, extended producer responsibility can be applied and needs to be set up by policy and regulation. The following POPs contaminated wastes can be covered under the extended producer responsibility framework:

- E-waste including e-waste plastic;
- End of life vehicle (including the polymers);
- Empty pesticides containers and stockpiles;
- Synthetic carpets; and
- Firefighting foams.

In the development of the funding mechanism for waste management, the value of the waste needs to be considered as a co-financing source. Vehicles (for example) have an inherent value, mainly from metals, and this value should be used to also manage the non-valuable fraction of plastic and other polymers and pollutants. Also, certain e-waste fractions have a value and can contribute to the finance of e-waste management. This requires the development of a waste management framework which restricts extraction of only valuables like metals without managing the remaining non-valuable fractions.

The polluter pays principle (PPP) can likely be used in the area of contaminated sites and hot spots. Before the principle can be applied, the related regulatory framework needs to be set-up so that the PPP can be used as co-financing source.

The NIP will be implemented through mobilization of various finance resources such as the national budget, overseas development grant aids, extended producer responsibility contributions, polluter pays principle contributions, loans, financing from organizations and individuals, etc.

The elaboration, allocation, and cost estimate decisions, as well as the management, use and settlement of funds for implementation of the National Plan should be conducted in accordance with regulations.

Strengthening international cooperation should be carried out in various areas such as technical cooperation, grant aid for project development, improving capacity, institutional improvement and supporting projects that resolve health problems and provide social benefits for the stakeholders.

LIST OF REFERENCES

- Balgobin, Aaron, 2016: Anthropogenic hydrocarbon pollution impact on the Coastal areas along the West Coast of Trinidad. Project No. GF12000201. University of Trinidad and Tobago, Trinidad
- Basel Convention Coordinating Centre for the Africa Region (BCCC-Africa), 2012: Inventory of POP - PBDEs in the Transport Sector in Nigeria
- BCRC-Caribbean, 2015: National Chemicals Profile for Chemicals Management, Trinidad and Tobago
- BCRC - Caribbean, 2017a: National Inventory Report for POP Pesticides in Trinidad and Tobago for 2016, prepared by CARPHA
- BCRC - Caribbean, 2017b: National Inventory Report for POPs Polychlorinated Biphenyls (PCBs) in Trinidad and Tobago for 2016, prepared by CARPHA
- BCRC - Caribbean, 2017c: National Inventory Report for Polybrominated diphenyl ethers (POP-PBDEs), Hexabrominated biphenyl (HBB) and Hexabromocyclododecane (HBCD) in Trinidad and Tobago for 2016, prepared by CARPHA
- BCRC - Caribbean, 2017d: National Inventory Report for Perfluorooctane Sulfonic acid (PFOS) and related substances in Trinidad and Tobago for 2016, prepared by CARPHA
- BCRC - Caribbean, 2017e: National Inventory Report for Unintentional Persistent Organic Pollutants in Trinidad and Tobago for 2016, prepared by CARPHA
- Camenzuli L, Scheringer M, Gaus C, Grant S, Zennegg M, Hungerbühler K, 2015: Historical Emissions of Octachlorodibenzodioxin in a Watershed in Queensland, Australia: Estimation from Field Data and an Environmental Fate Model. *Sci Total Environ.* 502, 680-687
- Central Statistical Office (CSO), 2017: www.cso.gov.tt
- Environmental Management Authority, 2018: National Environmental Policy of Trinidad and Tobago (2018)
- Garraway, E. and Ott, D., 2010: E-Waste Assessment in Trinidad and Tobago – A Situation Analysis of E-Waste Management and Generation with Special Emphasis on Personal Computers. EMPA, Geneva
- Government of the Republic of Trinidad and Tobago (GORTT), 2013: National Implementation Plan (NIP) for Trinidad and Tobago
- Government of the Republic of Trinidad and Tobago (GORTT), 2017: Review of the Economy 2017 – Changing the Paradigm; Putting the Economy on a Sustainable Path
- Grant S, Hermanussen S, Papke O, Gaus C, 2006: Levels and Sources of PCDDs and PCDFs in Sugarcane and Pineapple Agricultural Soils from Hawaii. In: Catherine Thomsen and Georg Becher, *Organohalogen Compounds* 68, 2244-2247
- Gullett BK, Wyrzykowska B, Grandesso E, Touati A, Tabor DG, Ochoa GS, 2010: PCDD/F, PBDD/F, and PBDE Emissions from Open Burning of a Residential Waste Dump. *Environ Sci Technol.* 44, 394-399
- Kajiwara N, et al., 2014: Brominated Flame Retardants and Related Substances in the Interior Materials and Cabin Dusts of End-of-Life Vehicles Collected in Japan. *Organohalogen Compound* 76, 1022–1025
- Minh NH, et al., 2003: Open Dumping Site in Asian Developing Countries: A Potential Source of Polychlorinated Dibenz-P-Dioxins and Polychlorinated Dibenzofurans. *Environ Sci Technol.* 37(8), 1493-1502
- Ministry of Energy and Energy Industries (MEEI), Government of the Republic of Trinidad and Tobago: <http://www.energy.gov.tt>
- Ministry of Planning and Development, 2016: National Development Strategy 2016–2030 (Vision 2030)

Mohammed, Azad; Peterman, Paul; Echols, Kathy; Feltz, Kevin; Tegerdine, George; Manoo, Anton; Maraj, Dexter; Agard, John; Orazio, Carl; 2011: Polychlorinated Biphenyls (PCBs) and Organochlorine Pesticides (OCPs) in Harbour Sediments from Sea Lots, Port-of-Spain, Trinidad and Tobago, 2011

Mohoyodeen, Khalel, 2013: Determination of Persistent Organic Pollutants (POPs) Stockpiles and the Identification and Quantification of Unintentional POPs Sources and Loads in Trinidad and Tobago (Final Report)

Sammy, George K. and McCalla, Winston, 2011: Strengthening the Legislative, Regulatory and Enforcement Capacity of Small Island Developing States (SIDS) in the Caribbean with Regard to the Basel, Stockholm and Rotterdam Conventions – Recommendations to Fill Gaps and Needs Identified for Trinidad and Tobago; May 23, 2011

Scheringer M, Stempel S, Hukari S, Ng CA, Blepp M, Hungerbuhler K, 2012: How Many Persistent Organic Pollutants Should We Expect? Atmospheric Pollution Research 3, 383-391

Toichuev RM, Victorovna L, Bakhtiyarovna ZG, Timur M, Payzildaev R, Pronk W, Bouwknecht M, Weber R, 2017: Assessment and Review of Organochlorine Pesticide Pollution in Kyrgyzstan. Environmental Science and Pollution Research. DOI: 10.1007/s11356-017-0001-7

Trinidad and Tobago Energy Conference, 2017: Feature Address by the Hon. Minister Colm Imbert, Minister of Energy and Energy Industries, Republic of Trinidad and Tobago (Ag.). Available online at: <http://www.ttenergyconference.org/2017/01/feature-address-hon-minister-colm-imbert/>

United Nations Environment Programme (UNEP), 2002: Central America and the Caribbean Regional Report, Regionally Based Assessment of Persistent Toxic Substances

UNEP, 2013: Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional POPs under Article 5 of the Stockholm Convention. Available online at: <http://toolkit.pops.int/>

United Nations Environment Programme (UNEP), 2017a: Draft Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

United Nations Environment Programme (UNEP), 2017b: Stockholm Convention on Persistent Organic Pollutants (POPS) Texts and Annexes, Revised in 2017

United Nations Environment Programme (UNEP), 2017c: Draft Guidance on Preparing Inventories of Polychlorinated Naphthalenes. UNEP/POPS/COP.8/INF/19

United Nations Environment Programme (UNEP), 2017d: Draft Guidance for the Inventory of Polybrominated Diphenyl Ethers (PBDEs) Listed Under the Stockholm Convention on Persistent Organic Pollutants. UNEP/POPS/COP.7/INF/27

United Nations Environment Programme (UNEP), 2017e: Draft Guidance for the Inventory of Hexabromocyclododecane (HBCD)

United Nations Environment Programme (UNEP), 2017f: Draft Guidance on Preparing Inventories of Hexachlorobutadiene (HCBD). UNEP/POPS/COP.8/INF/18

United Nations Environment Programme (UNEP), 2017g: Draft Guidance for the Inventory of Perfluorooctane Sulfonic Acid (PFOS) and Related Chemicals Listed Under the Stockholm Convention on Persistent Organic Pollutants. UNEP/POPS/COP.7/INF/26

UNEP/WHO, 2013: Results of the Global Survey on Concentrations in Human Milk of Persistent Organic Pollutants by the United Nations Environment Programme and the World Health Organization

United Nations Food and Agriculture Organisation (FAO), 2013: Prevention and Disposal of Obsolete Pesticides: FAO helps reduce risks from pesticides in the Caribbean. Available online at: <http://www.fao.org/agriculture/crops/obsolete-pesticides/what-now/world-projects/latin-projects/en/>

United Nations Food and Agriculture Organisation (FAO), 2016: FAO Caribbean-Trinidad Safeguarded Stocks. Unpublished data

United Nations Industrial Development Organization (UNIDO), 2016: Persistent Organic Pollutants: Contaminated Site Investigation and Management Toolkit

United States Agency for International Development (USAID), 2011: Tips for Conducting a Gender Analysis at the Activity and Project Level. Additional Help for ADS Chapter 201