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**Harmonised List of Pollutants for Global Pollutant Release and Transfer Registers
(PRTRs)**

**Series on Pollutant Release and Transfer Registers
No. 26**

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Series on Pollutant Release and Transfer Registers
No. 26

Harmonised List of Pollutants for Global Pollutant Release and Transfer
Registers (PRTRs)

IOMC

INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS

A cooperative agreement among **FAO, ILO, UNDP, UNEP, UNIDO, UNITAR, WHO, World Bank and OECD**

Environment Directorate

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

Paris 2022

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or contact:

**OECD Environment Directorate,
Environment, Health and Safety Division
2 rue André-Pascal
75775 Paris Cedex 16
France**

E-mail: ehscont@oecd.org

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FOREWORD

In 2014, the Organisation for Economic Co-operation and Development (OECD) published a harmonised list of pollutants based on those covered by five PRTRs and the Kyiv Protocol. This document was the result of several years of analysis of PRTR pollutant lists by the Working Party on PRTRs.¹ The purpose of the effort was to produce a harmonised list of pollutants that could improve the comparability of PRTR data on a global scale. Providing a list of core pollutants common to most PRTRs enhances comparability for existing PRTRs and provides a basis for a pollutant list for PRTRs under development. Incorporating the harmonised pollutants into more PRTRs will increase the utility of PRTR data globally by improving analyses in support of assessing questions of global sustainability.

Since it was initially published, the harmonised list of pollutants has been widely used by established and developing PRTRs. The purpose of this revised version of the document is to update the harmonised list to: 1) include updated information, namely on the most recent pollutant lists from PRTRs in the original analysis and on the more recently developed PRTRs; and 2) provide the harmonised list in a more readily useable Excel format.

All these works, including analysis, discussion, and drafting in this project, were led by the US. This document was prepared under the supervision of the WP-PRTRs and published under the responsibility of the Chemicals and Biotechnology Committee.

¹ This OECD group was a PRTR “Task Force” through 2018, then a PRTR “Working Group,” then a PRTR “Working Party.” This group provided input throughout the development of the 2014 harmonised list and this update, but for simplicity is referred to as the PRTR “Working Party” throughout this document, regardless of the group’s title at the time the input was provided.

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ABBREVIATIONS

API	Active Pharmaceutical Ingredient
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CAC	Criteria Air Contaminants
CAS Number	Chemical Abstracts Service number
CEPA	Canadian Environmental Protection Act
CFC	Chlorofluorocarbon
DDT	Dichlorodiphenyltrichloroethane
EEA	European Environmental Agency
EPCRA	Emergency Planning and Community Right-to-know Act
E-PRTR	European Pollutant Release and Transfer Register
GHG	Greenhouse Gas
HCB	Hexachlorobenzene
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
MOE	Ministry of the Environment
NIES	National Institute for Environmental Studies
NIP	National Implementation Plan
NPI	National Pollutant Inventory
NPRI	National Pollutant Release Inventory
OAR	Office of Air and Radiation
OECD	Organisation for Economic Co-Operation and Development
PAC	Polycyclic Aromatic Compounds
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCDD	Polychlorinated Dibenzodioxin
PCDF	Polychlorinated Dibenzofuran
PFAS	Per- and Poly-fluorinated Alkyl Substance
PFC	Perfluorocarbon
POP	Persistent Organic Pollutant
PRTR	Pollutant Release and Transfer Register
TCDD	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -Dioxin
TEF	Toxic Equivalency Factor
TEQ	Toxic Equivalent
TFPRTR	Task Force on Pollutant Release and Transfer Registers
TRI	Toxics Release Inventory (the U.S.)
TSMP	Toxic Substances Management Policy

U.S. EPA	United States Environmental Protection Agency
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VOC	Volatile Organic Compound
WHO	World Health Organization
IUPAC	International Union of Pure and Applied Chemistry

EXECUTIVE SUMMARY

The primary reason for the Organisation for Economic Co-operation and Development (OECD) to propose a common list of pollutants was to increase the comparability of the existing data derived from various PRTR systems. Moreover, comparability is enhanced if newly established systems use the same pollutants and definitions as existing systems.

This effort produced two lists: a "Long Chemical List" and a "Short Chemical List." The Long Chemical List was developed by combining the pollutants covered by five PRTRs², and then refining the resulting list to combine duplicate entries, separate similar entries that correspond to different chemicals, and make corrections to erroneous entries. In addition, chemicals covered under the Kyiv Protocol on Pollutant Release and Transfer Registers were integrated into the list. The resulting Long Chemical List includes 1272 chemicals. Following discussions with the representatives of the PRTR systems involved, the Long Chemical List was divided into 14 general pollutant classes (Table 1). Thirteen pollutant classes were in the 2014 version of the Long Chemical List, and this update adds a new "per- and poly- fluorinated alkyl substances (PFAS) category, which encompass new PFAS additions to the U.S. TRI.

Table 1. Distribution of Long List Chemicals across Classes

Class	Chemicals	
	Count	Percent
1. Persistent Organic Pollutants (POPs)	57	4%
2. Metals*	76	6%
3. Inorganic substances	39	3%
4. Chlorinated and brominated organic substances	92	7%
5. Ozone depleting substances	43	3%
6. Greenhouse gases (GHGs)	6	0.5%
7. Other gases	13	1%
8. Polycyclic aromatic compounds (PACs/PAHs)	38	3%
9. Other organic substances	374	29%
10. Active substances of plant protection products or biocidal products	260	20%
11. Colors and dyes	21	2%
12. Active pharmaceutical ingredient (API)	8	1%
13. Per- and poly- fluoroalkyl substances (PFAS)**	164	13%
14. Non-grouped organic substances	81	6%
Total	1 272	100%

*Note that the term 'heavy metals' used in the E-PRTR system is replaced with the term 'metals' to comply with the IUPAC interpretation.

² Australia's NPI (National Pollutant Inventory), Canada's NPRI (National Pollutant Release Inventory), Europe's E-PRTR (European Pollutant Release and Transfer Register), Japan's PRTR (Pollutant Release and Transfer Register) and the U.S.'s TRI (Toxics Release Inventory).

** The per- and poly-fluoroalkyl substances (PFAS) category excludes those PFAS considered POPs, which are instead categorised as POPs.

The next step in the project was to define a common list of pollutants (a "Short Chemical List") that includes chemicals that most countries would agree represent the most toxic or environmentally relevant chemicals in commerce. This Short Chemical List can serve as a tool for consideration in the development of new PRTRs and the enhancement of existing PRTRs.

The OECD Working Party on PRTRs decided that chemicals meeting any of the following criteria would be included on the Short Chemical List:

1. Chemicals covered by four or more of the five PRTRs,
2. Persistent Organic Pollutants (POPs),
3. Greenhouse Gases (GHGs), or
4. Chemicals covered under the Kyiv Protocol.

Applying these criteria to the Long Chemical List results in a Short Chemical List that includes the counts of chemicals per class, as shown in Table 2.

Table 2. Total Number of Pollutants Present on the Short Chemical List

Class	Number of Chemicals in at least 4 PRTR systems + POPs + GHGs + Kyiv Protocol
1. Persistent Organic Pollutants (POPs)	25
2. Metals	13
3. Inorganic Substances	11
4. Chlorinated and brominated organic substances	18
5. Ozone depleting substances	3
6. Greenhouse gases (GHGs)	6
7. Other gases	1
8. Polycyclic Aromatic Compounds (PACs/PAHs)	3
9. Other organic substances	34
10. Active substances of plant protection products or biocidal products	10
11. Colors and dyes	-
12. Active pharmaceutical ingredient (API)	-
13. Per- and poly-fluoroalkyl substances (PFAS)	-
14. Non-grouped organic substances	-
Total	124

Three tasks were then undertaken to enhance these Long and Short Chemical Lists with contextual information that may be of use for applying the lists to develop and enhance of PRTRs:

1. **Addition of chemical-specific thresholds:** documenting reporting thresholds associated with each pollutant established under each PRTR system.
2. **Addition of reporting data:** appending measures of how frequently each chemical is reported to each PRTR.
3. **Addition of 'supplemental' PRTRs:** adding information on the pollutants reported to the PRTRs of Chile, Israel, Korea, and Mexico.

The enhanced Long and Short Chemical Lists are presented in the Excel file associated with this report.

1. BACKGROUND AND OBJECTIVES

Pollutant Release and Transfer Register (PRTR) systems have been established throughout the world to track releases and transfers of potentially harmful chemicals. Most of the PRTR systems established to date were designed to meet the needs of a specific country or region, with less attention being given to the comparability of the data among different PRTRs. Consequently, PRTRs have differing requirements, including different covered chemicals. Their respective differences confound data integration across programs and hamper comparative analyses and aggregation of the valuable information PRTRs contain.

With the ever-increasing emphasis on sustainable development as a global priority, the need to evaluate progress at the global level continues to grow, to complement country-specific or regional analyses. PRTRs are demonstrably a practical and powerful source of information that can be used to meet this need; however, combining and comparing PRTR data for use in global scale analysis remains a challenge. The OECD Working Party on PRTRs³ has been improving the consistency of PRTRs around the world for more than 20 years through a series of analyses and documents that promote and facilitate comparability across PRTRs.

One of the OECD harmonisation efforts focused on the differences in the pollutants covered among PRTRs. In 2014, OECD published a harmonised list of the pollutants covered by five PRTRs and the Kyiv Protocol. This document was the result of analyses of PRTR pollutant lists by the Working Party on PRTRs. The purpose of the effort was to produce a harmonised list of pollutants that could improve the comparability of PRTR data on a global scale. Providing a list of core pollutants common to most PRTRs enhances comparability for existing PRTRs and provides a basis for a pollutant list for PRTRs under development. Incorporating the harmonised pollutants into more PRTRs will increase the utility of PRTR data globally by improving analyses in support of assessing questions of global sustainability.

Since it was initially published, the harmonised list of pollutants has been widely used by established and developing PRTRs. This revision of the harmonised list had two goals: 1) include updated information, namely on the most recent pollutant lists from PRTRs in the original analysis and on the more recently developed PRTRs; and 2) provide the harmonised list in a more readily useable Excel format. See Section 6 for details on the changes made. The results are two harmonised lists:

- The 'Long Chemical List' which is a list of all chemicals covered by any of five major PRTRs,⁴ the persistent organic pollutants (POPs) per the Stockholm convention, and those chemicals recommended in the UNECE Kyiv Protocol on PRTRs⁵.

³ This OECD group was a PRTR "Task Force" through 2018, then a PRTR "Working Group," then a PRTR "Working Party." This group provided input throughout the development of the 2014 harmonised list and this update, but for simplicity is referred to as the PRTR "Working Party" throughout this document, regardless of the group's title at the time the input was provided.

⁴ Australia's NPI (National Pollutant Inventory), Canada's NPRI (National Pollutant Release Inventory), Europe's E-PRTR (European Pollutant Release and Transfer Register), Japan's PRTR (Pollutant Release and Transfer Register) and the U.S.'s TRI (Toxics Release Inventory)

⁵ The UNECE Kyiv Protocol on Pollutant Release and Transfer Registers is a legally binding international instrument on pollutant release and transfer registers. Its objective is "to enhance public access to information through the establishment of coherent, nationwide pollutant release and transfer registers (PRTRs)." The Protocol became international law binding its Parties on 8 October 2009. For more information go to www.unece.org/env/pp/prtr.html.

- The 'Short Chemical List' is a common list of pollutants meant to include chemicals that most countries would agree represent the most toxic or environmentally relevant chemicals in commerce. Therefore, it should be considered for inclusion in any PRTR system. Based on the recommendation of the OECD Working Party on PRTRs, the Short Chemical List includes all chemicals that are:
 - covered by four or more of the five PRTRs,
 - POPs per the [Stockholm Convention](#),
 - Greenhouse Gases (GHGs) per the United Nations Framework Convention on Climate Change (UNFCCC), or
 - covered under the Kyiv Protocol.

The Long and Short Chemical Lists are meant to serve as tools for consideration in the development of new PRTRs and enhancement of existing PRTRs, such that new and updated PRTRs can be designed to collect data comparable to the scope of and information collected by existing PRTR systems.

This document outlines the methods used and results from the comparison of chemical coverage across PRTRs and the development of the Long and Short Chemical Lists. The results lists are available in an Excel format.

2. CONSIDERED PRTR PROGRAMS

The following PRTR programs were considered in developing a harmonised list of pollutants:

- Australia's National Pollutant Inventory (NPI);
- Canada's National Pollutant Release Inventory (NPRI);
- The European Pollutant Release and Transfer Register (E-PRTR);
- Japan's Pollutant Release and Transfer Register (PRTR); and
- The U.S.'s Toxics Release Inventory (TRI) Program.

Chemicals recommended in the UNECE Kyiv Protocol on PRTRs, Persistent Organic Pollutants (POPs) per the Stockholm Convention, and Greenhouse Gases (GHGs) per the United Nations Framework Convention on Climate Change (UNFCCC) were also considered for the harmonised list.

Note that, in some countries, complementary mechanisms are used to track and report on pollutants and substances of concern (e.g., Persistent Organic Pollutants (POPs), Greenhouse Gases (GHGs)). The existence of separate systems for tracking certain pollutants may account for some differences in the chemicals covered by each PRTR.

2.1. Australian National Pollutant Inventory (NPI)

The National Pollutant Inventory (NPI) is a [public database](#) of air, land and water emissions of substances and transfers of NPI substances in waste from industrial facilities and emissions of diffuse sources. The objectives of the NPI are to (Australian Government, 2015):

- Help industry and government with environmental planning and management;
- Give the community up-to-date information about substance emissions and transfers from industrial facilities; and
- Promote waste minimisation, cleaner production, and energy and resource efficiency.

Each year Australian industrial facilities which exceed defined thresholds for the NPI substances must estimate and report their emissions and transfers of NPI substances in waste to their state or territory environment agency. The state and territory environment agencies review all NPI reports for completeness and forward the data to the Australian Government. The data is then displayed on the NPI website (<http://www.npi.gov.au/reporting>).

The list of the NPI substances was included in developing the harmonised list of pollutants. These substances are included in the Harmonised List of Pollutants (Long Chemical List) Excel file associated with this report.

The NPI has six different threshold categories, with each of the NPI substances listed in one or more of these categories (Table 3).

Table 3. National Pollutant Inventory (NPI) Threshold Categories

Category	Threshold Category Descriptions
1	<p>Based on Substance Usage</p> <p>Category 1 contains a broad range of substances that are typically used for production. Most of the NPI substances fall into this category.</p> <p>The reporting threshold for this category is the 'use' of 10 tons or more per year of a Category 1 substance. For NPI purposes, 'use' is defined as the handling, manufacture, import, processing, coincidental production, or other use of a substance.</p>
1a	<p>Based on Substance Usage</p> <p>The reporting threshold for this category 1a is the use of 25 tons or more per year of Total VOC.</p> <p>For the purpose of NPI reporting, Total VOC are defined as: any chemical compound based on carbon chains or rings with a vapour pressure greater than 0.01 kPa at 293.15 K (i.e., 20 °C), that participate in atmospheric photochemical reactions.</p>
1b	<p>Based on Substance Usage</p> <p>Category 1b contains only mercury and compounds. Due to the high toxicity of mercury and exposure potential, it has a lower threshold than Category 1 substances. The threshold for mercury and compounds is the use of 5 kg or more in the reporting year.</p>
2a	<p>Based on Fuel Combusted</p> <p>This category contains a group of substances that are common products of combustion or other thermal processes. The NPI reporting thresholds for this category are:</p> <ul style="list-style-type: none"> burning of 400 tons or more of fuel and/or waste in the reporting year, or burning of 1 ton or more of fuel and/or waste in an hour at any time during the reporting year.
2b	<p>Based on Fuel Combusted</p> <p>This category also contains substances that are common products of combustion or other thermal processes and includes all Category 2a substances. It also includes metals and compounds emitted when fuels (especially coal and oil) are burned. The NPI thresholds for this category of substances are:</p> <ul style="list-style-type: none"> burning 2000 tons and/or more of fuel or waste in the reporting year consuming 60 000 megawatt hours or more of electrical energy for other than lighting or motive purposes in the reporting year, or having maximum potential power consumption of 20 megawatts or more for other than lighting or motive purposes in the reporting year.
3	<p>Based on Substance Usage, Including Transfers</p> <p>The threshold for Category 3 is based on the actual amount of Total Nitrogen and/or Total Phosphorus:</p> <ul style="list-style-type: none"> emitted to water (excluding groundwater); transferred to a mandatory reporting transfer destination; or emitted to water and transferred to a mandatory reporting transfer destination. <p>Emissions and transfers to mandatory destinations of both Total Nitrogen and Total Phosphorus have to be reported, if any of the above are at, or above:</p> <ul style="list-style-type: none"> 15 tons per year for Total Nitrogen, and/or 3 tons per year for Total Phosphorus.

Source: Australian Government. Department of the Environment (2015), National Pollutant Inventory Guide, Version 6.1, Australian Government, Canberra, <http://www.npi.gov.au/system/files/resources/2e4b4a22-ae4f-4254-55a2-e0098b016897/files/npi-guide-version-6.1-september-2015.pdf>.

Emissions of GHGs are reported to the National Greenhouse Gas Inventory, which provides estimates of Australian greenhouse gas emissions based on the latest available data and the accounting rules that apply for the Kyoto Protocol (Australian Government, 2021).

2.2. Canadian National Pollutant Release Inventory (NPRI)

The National Pollutant Release Inventory (NPRI) is Canada's legislated, [publicly accessible inventory](#) of pollutant releases, disposals and recycling. Sections 46–50 of the *Canadian Environmental Protection Act, 1999* (CEPA) contain information-gathering provisions that allow the Minister of the Environment and Climate Change to require reporting of information on substances. The provisions also require the Minister to establish and publish a national inventory of releases and transfers of pollutants.

These provisions under CEPA form the primary legislative basis for the NPRI. The NPRI reporting requirements are published in the [Canada Gazette](#) (Environment and Climate Change Canada, 2020a).

NPRI information is a major starting point for identifying and monitoring sources of pollution in Canada, and in developing indicators for the quality of air, land and water. The NPRI helps determine if regulatory or other action is necessary to ensure reductions, and if so, the form that action should take. The NPRI provides Canadians with annual information on releases and transfers from industrial, institutional, commercial facilities in their communities (Environment and Climate Change Canada, 2020a).

In the development of the harmonised list of pollutants, the substance list from 2020-2021 was used (Government of Canada, 2021a). These substances are included in the Harmonised List of Pollutants (Long Chemical List) in the Excel file associated with this report.

Substances and substance groups listed on the (NPRI) are grouped into five different parts (see Table 4).

Table 4. Parts of National Pollutant Release Inventory (NPRI) Substance List 2020-2021

Part	Substances
1	Lists 205 substances and groups of substances and is divided into Part 1A and Part 1B, based on thresholds and information to be reported
2	Lists 31 individual polycyclic aromatic hydrocarbons (PAHs)
3	Lists 7 dioxins, 10 furans and hexachlorobenzene (HCB)
4	Lists 7 criteria air contaminants (CACs)
5	Lists 62 selected volatile organic compounds (VOCs) and groups of VOCs with additional reporting requirements (speciated VOCs)

Source: Environment Canada (2020), Guide for Reporting to the National Pollutant Release Inventory 2020 and 2021, Environment Canada, Gatineau, http://publications.gc.ca/collections/collection_2020/eccc/En81-1-2020-eng.pdf

Some substances are listed in Parts 1-4 as well as in Part 5. The Threshold Category Descriptions for the different parts of the inventory are summarised in Table 5.

Facilities where the employees work a total of 20 000 hours or more during the calendar year (the employee threshold) are required to report to the NPRI, if the thresholds for at least one substance are met, or if an activity-based threshold is met. The employee threshold depends on the number of hours worked by all employees at the facility during the calendar year. Additional details can be found in the [Guide for Reporting to the National Pollutant Release Inventory 2020 and 2021](#).

Table 5. NPRI Threshold Category Descriptions

Part	Threshold Category Descriptions
1A	<p>Mass threshold: 10 tonnes</p> <p>A report is required for one or more substances if they were</p> <ul style="list-style-type: none"> • manufactured, processed or otherwise used at a facility at a concentration $\geq 1\%$ by weight (except for by-products and mine tailings) and in a quantity of 10 tons or more, and employees worked 20 000 hours or more at a facility, plus • incidentally manufactured, processed or otherwise used as a by-product at any concentration, plus • contained in tailings at any concentration, plus • contained in waste rock that is not clean or inert at a concentration by weight of $\geq 1\%$
1B	<p>Mass threshold: 5 to 100 kilograms, depending on substance.</p> <p>A report is required for substances if they were</p> <ul style="list-style-type: none"> • manufactured, processed or otherwise used at a concentration by weight greater than or equal to the concentration threshold (0.000005% to 1%, depending on the substance, or regardless of concentration for mercury), plus • incidentally manufactured, processed or otherwise used as a by-product at any concentration, plus • contained in tailings at any concentration, plus • contained in waste rock that is not clean or inert at any concentration
2	<p>A report is required for substances if polycyclic aromatic hydrocarbons (PAHs) were incidentally manufactured or present in mine tailings, and released, disposed or transferred from a facility in a combined quantity of 50 kilograms or more, and employees worked 20 000 hours or more at a facility. Wood preservation facilities using creosote must report regardless of the reporting threshold for PAHs and regardless of the number of hours worked by employees.</p>
3	<p>A report is required for substances if a facility was engaged in specific activities regardless of quantities or concentrations.</p>
4	<p>Mass threshold: varies depending on substance.</p> <p>All facilities are required to consider Criteria Air Contaminants (CACs) released from stationary combustion equipment regardless of the number of employees at the facility. Additionally, facilities with greater than 20 000 employee hours must also consider all other sources of CACs at the facility.</p>
5	<p>A report is required for any of the listed Volatile Organic Compounds (VOCs) (including individual substances, isomer groups and other groups and mixtures) if they were released to air in a quantity of 1 ton or greater and the 10-ton air release threshold for VOCs (under Part 4) was met.</p>

Source: Environment Canada (2020), Guide for Reporting to the National Pollutant Release Inventory 2020 and 2021, Environment Canada, Gatineau, http://publications.gc.ca/collections/collection_2020/eccc/En81-1-2020-eng.pdf

Greenhouse gas emissions are reported to Canada's [Greenhouse Gas Emissions Reporting Program](#) (GHGRP), a complementary program to the NPRI (Environment and Climate Change Canada, 2020b).

Substances on Canada's NPRI Chemical List may be added, removed, renamed, grouped, or be listed with new reporting requirements over time. Delisted pollutants are not included as NPRI-reportable chemicals, since they are not currently reportable; pollutants were removed from the Long Chemical List if removal from NPRI means they are not reportable to any PRTR.

2.3. European Pollutant Release and Transfer Register (E-PRTR)

The European Pollutant Release and Transfer Register (E-PRTR) provides environmental data from industrial facilities in European Union Member States (EU27) and in Iceland, Liechtenstein, Norway, Serbia, Switzerland, and the United Kingdom (EEA, n.d.).

The EU27 is composed of the following 27 sovereign Member States: Austria, Belgium, Bulgaria, Croatia, the Republic of Cyprus^{6,7}, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Regulation (EC) No 166/2006 of the European Parliament and of the Council (European Commission, 2006a) concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC" 1 (the 'E-PRTR Regulation') was adopted in 2006. The E-PRTR Regulation aims to enhance public access to environmental information through the establishment of a coherent and integrated E-PRTR, thereby contributing to the prevention and reduction of pollution, delivering data for policy makers and facilitating public participation in environmental decision making. The regulation establishes an integrated pollutant release and transfer register at the community level in the form of a publicly accessible electronic database and lays down rules for its functioning, in order to implement the UNECE Protocol on Pollutant Release and Transfer Registers and facilitate public participation in environmental decision making, as well as to contribute to the prevention and reduction of pollution of the environment (European Commission, 2006a).

Annex II of the E-PRTR Regulation lists the pollutants that are relevant for reporting under the E-PRTR (European Commission, 2006a). These pollutants are included in the Harmonised List of Pollutants (Long Chemical List) in the Excel file associated with this report.

The register currently contains annual data reported by 65 economic activities (EEA, 2013). Data is provided in the register for pollutants falling under the following 7 groups (EEA, 2013):

- Greenhouse gases;
- Other gases;
- Heavy metals;
- Pesticides;
- Chlorinated organic substances;
- Other organic substances; and
- Inorganic substances.

A facility has to report data under E-PRTR if it fulfils the following criteria (European Commission, 2006a):

- The facility falls under at least one of the E-PRTR economic activities listed in Annex I of the E-PRTR Regulation and exceeds at least one of the E-PRTR capacity thresholds; and
- The facility transfers waste off-site which exceed specific thresholds set out in Article 5 of the Regulation; or

⁶ Footnote by Turkey

The information in this document with reference to « Cyprus » relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

⁷ Footnote by all the European Union Member States of the OECD and the European Union

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

- The facility releases pollutants which exceed specific thresholds specified for each media - air, water and land - in Annex II of the E-PRTR Regulation.

The data to be reported annually by each facility for which the applicable thresholds are exceeded are the following (European Commission, 2006a):

- Releases to air, water and land of any of the E-PRTR pollutants.
- Off-site transfers of any of the E-PRTR pollutants in wastewater destined for wastewater treatment outside the facility.
- Off-site transfers of waste (reported as tonnes per year) for recovery or disposal. For transboundary movements of hazardous waste outside the reporting country, details of the waste receivers have to be provided.
- The reported releases include any introduction of any of the listed pollutants into the environment as a result of any human activity, whether deliberate, accidental, routine or non-routine, at the site of the facility.

The UNFCCC GHGs are also included in the E-PRTR.

2.4. Japanese Pollutant Release and Transfer Register (PRTR)

The goals of the Japanese PRTR system are to promote voluntary improvement of the management of chemical substances by business operators and to prevent impediments to the preservation of the environment by taking measures for the confirmation of release amounts, etc. of specific chemical substances in the environment by business operators. The PRTR information plaza provides PRTR-related information, from an overview of the PRTR system to the results of data collected (Government of Japan, n.d.a).

Japan's PRTR is a system that (i) requires businesses handling chemical substances potentially hazardous to the environment to estimate the amounts of chemical substances released and transferred in waste, and to report the data to their local governments, and (ii) the national government then compiles data submitted and makes the results public. The PRTR aims to establish a common background for risk communication among the government, the business operators and the public by providing data about releases of chemical substances to the environment. These data also help the business operators to manage their releases. Consequently, it can contribute to the reduction of environmental risks from chemical substances (Government of Japan, n.d.a).

Chemical substances that are subject to the PRTR are called Class I Designated Chemical Substances. Class II Designated Chemical Substances are not subject to PRTR reporting (Government of Japan, 2006). Class I Designated Chemical Substances are those that fall under any of the following conditions of hazard and are recognised as being persistent in the environment (Government of Japan, n.d.a).

- Chemical substances that may be hazardous to human health and/or may adversely affect the ecosystem,
- Chemical substances that may easily form hazardous chemical substances through a naturally occurring chemical transformation,
- Chemical substances that deplete the ozone layer.

The list of Class I substances was expanded from 354 to 462 substances in 2008 (applied for reporting in Japanese Fiscal Year 2010). The list of Class I Designated substances are included in the Harmonised List of Pollutants (Long Chemical List) in the Excel file associated with this report (Government of Japan, 2010).

The following reporting thresholds are applied (Government of Japan, n.d.a):

- i. by business
 - type of business: 24 industries
 - size of business operators: business operators with 21 or more regular employees
- ii. by facilities
 - Annual amount handled, etc.: facilities with an annual amount of 1 ton or more (5 tons or more for the initial 2 years), but 0.5 tons or more for Specific Class 1 Designated Chemical Substances; or
 - A business operator that has a facility meeting the specific requirements
 - Relevant facilities under the Mine Safety Law
 - Sewage disposal facilities
 - Domestic waste disposal facilities/Industrial waste disposal facilities
 - Specific facilities under the Act on Special Measures against Dioxins

Japan has the program to mandate entities that emit considerably large amounts of greenhouse gases (GHGs) to account and report their emissions to the government annually. The government develops a national greenhouse gas inventory and reports it every year to the UNFCCC secretariat under the UNFCCC and the Kyoto Protocol (Greenhouse Gas Inventory Office of Japan and Ministry of the Environment Japan, 2020).

2.5. U.S. Toxics Release Inventory (TRI)

Reporting to the Toxics Release Inventory (TRI) is required by Section 313 of the Emergency Planning and Community Right to Know Act (EPCRA, or Title III of the Superfund Amendments and Reauthorization Act of 1986), Public Law 99 499. Reporting is required to provide the public with information on the releases and other waste management of TRI chemicals in their communities and to provide EPA with release and other waste management information to assist the Agency in determining the need for future regulations. Facilities meeting the reporting criteria must report the quantities of chemical releases and the amount contained in wastes managed on-site or transferred off-site (U.S. EPA, 2021a).

The TRI toxic chemical list contains 770 individually listed chemicals and 33 chemical categories (U.S. EPA 2021a). These pollutants are included in the Harmonised List of Pollutants (Long Chemical List) in the Excel file associated with this report.

Section 313 of EPCRA requires that reports be filed by owners and operators of facilities that meet all of the following criteria (U.S. EPA, 2021a):

- The facility has 10 or more full-time employee equivalents (i.e., a total of 20,000 hours or greater; see 40 CFR 372.3); and
- The facility is included in a covered industry sector as designated by the facility's North American Industry Classification System (NAICS) code. Federally owned facilities are also required to report, per a 1993 executive order.
- The facility manufactures, processes, or otherwise uses any TRI chemical in quantities greater than the established threshold in the course of a calendar year.

The *de minimis* exemption allows facilities to disregard certain minimal concentrations of most chemicals in mixtures or other trade name products when making threshold determinations and release and other waste management calculations. The *de minimis* exemption does not apply to: the manufacture of a TRI chemical in most cases; by-products manufactured coincidentally; or any chemical of special concern (except lead when it is contained in stainless steel, brass or bronze alloy) or chemical category of special concern (U.S. EPA, 2021).

With respect to GHGs, the U.S. EPA's TRI Program does not collect release or other waste management quantities of GHGs. However, the U.S. EPA's Office of Air and Radiation (OAR) regulations require reporting of GHG data and other relevant information from large sources and suppliers in the United States. These data and information are made available to the public (U.S. EPA 2021b).

Note that certain pollutants listed on TRI were placed under reporting stays in 1995 (i.e., the reporting of the chemicals has been temporarily halted but may be resumed in the future), and some pollutants have been delisted. These pollutants are not included as TRI-reportable chemicals on the 'Long Chemical List', since they are not currently reportable, and no recent data are available for these chemicals.

3. PREPARATION OF A HARMONISED LIST OF POLLUTANTS (LONG CHEMICAL LIST)

3.1. Criteria for the harmonised list of pollutants

This update to the harmonised list of pollutants includes updated information on the most recent pollutant lists from the five major PRTRs in the analysis to develop an updated 'Long Chemical List'. The Long Chemical List is a list of all chemicals covered by any of five major PRTRs,⁸ POPs per the Stockholm convention, GHGs listed by the UNFCCC, and those chemicals recommended in the UNECE Kyiv Protocol on PRTRs⁹. Section 6 provides details on the changes made in this updated version of the harmonised lists of pollutants.

3.2. Categorisation of pollutants

The Long Chemical List was divided into 14 general pollutant classes (Table 6). The two largest classes, other organic substances and active substances of plant protection products or biocidal products, contained over half (634) of the chemicals on the Long Chemical List.

Thirteen pollutant classes were in the 2014 version of the Long Chemical List and this update adds a new 'per- and poly- fluorinated alkyl substances (PFAS)' category, which encompasses new PFAS additions to the U.S. TRI. The term 'PFAS' can be defined in many different ways. For purposes of this update, only chemicals newly added to the TRI as PFAS were included in the PFAS category. Some chemicals, such as many fluorinated ozone depleting substances may fit certain interpretations of the term 'per- and poly- fluorinated substances', but were not included in the PFAS category. PFOS, PFOA, and their salts were also excluded from the PFAS category because there are already included in the Persistent Organic Pollutants category.

⁸ Australia's NPI (National Pollutant Inventory), Canada's NPRI (National Pollutant Release Inventory), Europe's E-PRTR (European Pollutant Release and Transfer Register), Japan's PRTR (Pollutant Release and Transfer Register) and the U.S.'s TRI (Toxics Release Inventory)

⁹ The UNECE Kyiv Protocol on Pollutant Release and Transfer Registers is a legally binding international instrument on pollutant release and transfer registers. Its objective is "to enhance public access to information through the establishment of coherent, nationwide pollutant release and transfer registers (PRTRs)." The Protocol became international law binding its Parties on 8 October 2009. For more information go to www.unece.org/env/pp/prtr.html.

Table 6. Distribution of Long List Chemicals across Classes

Class	Chemicals	
	Count	Percent
1. Persistent Organic Pollutants (POPs)	57	4%
2. Metals*	76	6%
3. Inorganic substances	39	3%
4. Chlorinated and brominated organic substances	92	7%
5. Ozone depleting substances	43	3%
6. Greenhouse gases (GHGs)	6	0.5%
7. Other gases	13	1%
8. Polycyclic aromatic compounds (PACs/PAHs)	38	3%
9. Other organic substances	374	29%
10. Active substances of plant protection products or biocidal products	260	20%
11. Colors and dyes	21	2%
12. Active pharmaceutical ingredient (API)	8	1%
13. Per- and poly-fluoro alkyl substances (PFAS)**	164	13%
14. Non-grouped organic substances	81	6%
Total	1272	100%

*Note that the term 'heavy metals' used in the E-PRTR system is replaced with the term 'metals' to comply with the IUPAC interpretation.

** The per- and poly-fluoroalkyl substances (PFAS) category excludes those PFAS considered POPs, which are instead categorised as POPs.

Chemicals within each of these fourteen classes were then subdivided into pollutant groups with similar characteristics. For example, the metal class was subdivided into pollutant groups such as 'copper and its compounds' which contains the following chemicals:

- Copper;
- Copper Compounds;
- Copper and its compounds; and
- Bis(8-quinolinolato)copper.

The full list of chemicals within each class and group is included in the Long Chemical List.

3.3. Coverage of pollutants across PRTRs

Of the chemicals on the Long Chemical List (for the full list, see the Excel file associated with this report), about 39% (500) chemicals were covered (as an individual listing, part of a group, partially covered, or covered by a separate greenhouse gas reporting system) by two or more PRTRs (Table 7). Of the remaining 772 chemicals, 764 were covered by one PRTR system and eight were covered by no PRTR systems. The eight chemicals not covered by any PRTR systems were included in the Long Chemical List due to categorisation as a Persistent Organic Pollutant.

Table 7. PRTR Coverage of Chemicals in the Long Chemical List

Coverage	Chemicals	
	Count	Percent
Chemicals Covered by 0 PRTRs	8	1%
Chemicals Covered by 1 PRTR	764	60%
Chemicals Covered by 2 PRTRs	223	18%
Chemicals Covered by 3 PRTRs	113	9%
Chemicals Covered by 4 PRTRs	86	7%
Chemicals Covered by 5 PRTRs	78	6%
All Chemicals (Total)	1272	100%

Note:

1. The count of chemicals is cumulative. That is, chemicals covered by at least four PRTRs total 164 (= 86 covered by 4 PRTRs + 78 covered by 5 PRTRs).
2. A chemical is considered to be covered by a PRTR if it is explicitly covered under a PRTR, a substance included as a compound entry in the respective PRTR, a group that is fully or partially covered by other pollutant entries in the PRTR, or a substance regulated in complementary programs to the respective PRTRs. Integration of chemicals covered under the Kyiv Protocol

The Kyiv Protocol on Pollutant Release and Transfer Registers is the first legally binding international instrument on pollutant release and transfer registers. Its objective is 'to enhance public access to information through the establishment of coherent, nationwide pollutant release and transfer registers (PRTRs).' The Protocol became international law binding its Parties on 8 October 2009 (UNECE 2013).

To compare chemical coverage between PRTRs meeting Kyiv Protocol specifications and the five PRTRs reviewed, chemicals covered under the Kyiv Protocol were noted in the Long Chemical List. A chemical was marked as covered by the Kyiv Protocol if its name and CAS number (as available) listed in the Long Chemical List matched the name and CAS number for a chemical listed in Annex II to the Kyiv Protocol (UNECE, 2008).

In total, 197 of the 1272 Long List Chemicals were marked as covered under the Kyiv Protocol. The marked chemicals include 87 chemicals that are the same as Kyiv Protocol chemicals, two chemicals partially covered by the Kyiv Protocol (Total Particulate Matter and Total Volatile Organic Compounds), and 108 chemicals that are substances covered by Kyiv Protocol chemical groups (for example, cadmium, which is included in the Kyiv listing for "cadmium and compounds").

4. PREPARATION OF A COMMON LIST OF POLLUTANTS (SHORT CHEMICAL LIST)

Based on the harmonised list of pollutants (Long Chemical List) as presented in the Excel file associated with this report, a common list of pollutants (Short Chemical List) was developed (see the Excel file associated with this report). The Short Chemical List is meant to be comprised of chemicals that most countries would agree represent the most toxic or environmentally relevant chemicals in commerce and, therefore, may be considered to be included in any PRTR system.

The criteria for the Short Chemical List (Table 8) selected by the Working Party on PRTRs were:

- Chemicals covered by four or more of the five PRTRs,
- All Persistent Organic Pollutants (POPs),
- All Greenhouse Gases (GHGs), and
- All Chemicals covered under the Kyiv Protocol.

Pollutants covered by multiple PRTR systems were included in the Short Chemical List due to the comparability of coverage for these chemicals across existing PRTRs. Persistent Organic Pollutants (POPs), Greenhouse Gases (GHGs), and chemicals covered under the Kyiv Protocol were included in the Short Chemical List due to their environmental relevance and inclusion in international environmental agreements.¹⁰

¹⁰ POPs are only partially or even not listed in some of the PRTR systems assessed during this study. However, they are subject to complementary programs. GHGs are only listed in the E-PRTR; but they are also subject to complementary programs in other countries.

Table 8. Total Number of Pollutants Present on the Short Chemical List

Class	Chemicals in at least 4 PRTR Systems + POPs + GHGs + Kyiv Protocol
1.Persistent Organic Pollutants (POPs)	25
2.Metals	13
3.Inorganic substances	11
4.Chlorinated and brominated organic substances	18
5.Ozone depleting substances	3
6.Greenhouse gases (GHGs)	6
7.Other gases	1
8.Polycyclic aromatic compounds (PACs/PAHs)	3
9.Other organic substances	34
10.Active substances of plant protection products or biocidal products	10
11.Colors and dyes	-
12.Active pharmaceutical ingredient (API)	-
13. Per- and poly-fluoro alkyl substances (PFAS)	-
14.Non-grouped organic substances	-
Total	124

In creating the Short Chemical List, certain chemical listings from the Long Chemical List were combined. For instance, only the 'Antimony and its compounds' category is included in the Short Chemical List, although the Long Chemical List includes listings for 'Antimony', 'Antimony Compounds', and 'Antimony and its compounds'. This consolidation was performed for concision.

All chemicals were individually listed on the Short Chemical List, except the following:

- Dioxins and dioxin-like compounds;
- Metals (only group categories listed);
- Inorganic cyanide compounds (as CN);
- Fluorine and fluorides (as total F);
- Phosphorus (total);
- PM10 - Particulate matter;
- Chlorine and chlorides (as total Cl);
- Total nitrogen;
- Brominated diphenylethers (PBDE);
- Chlorinated toluenes and phenols;
- Halogenated organic compounds (as AOX);
- HCFCs;
- CFCs;
- Halons;
- HFCs;
- PFCs;
- Polycyclic aromatic compounds (PACs);
- Organotin compounds (as total Sn);
- Tributyltin and compounds;

- Triphenyltin and compounds;
- Nonylphenol and Nonylphenol ethoxylates (NP/NPEs);
- Non-methane volatile organic compounds (NMVOC); and
- Total organic carbon (TOC).

The Short Chemical List should serve as a valuable tool for consideration in the development of new PRTRs and the enhancement of existing PRTRs; it is not meant to be guidance.

5. SUPPLEMENTAL INFORMATION IN THE LONG AND SHORT CHEMICAL LISTS

The following information was added to the Long and Short Chemical Lists to provide context and improve the usability of the lists:

1. **Chemical-specific thresholds.** The lists include the reporting thresholds associated with each pollutant established under each of the five PRTR systems.
2. **Reporting frequency.** The lists provide a measure indicating how frequently each chemical is reported to each of the five PRTR systems.
3. **Other PRTRs:** The pollutant lists of the PRTRs of Chile, Israel, Korea, and Mexico were incorporated into the Long and Short Chemical Lists as a reference but these PRTRs were not included in the criteria for inclusion on the Short Chemical List.

5.1. Chemical-specific thresholds

Chemical-specific reporting thresholds define which chemicals must be reported by PRTR subject facilities. These thresholds vary across chemicals within a PRTR and across PRTRs for a given chemical (Table 9).

Chemical-specific thresholds were added to the Long Chemical List to inform the development of new PRTRs and the enhancement of existing PRTRs.¹¹ This information may be of value for setting thresholds and deciding what chemicals will be covered by a PRTR.

Chemical-specific reporting thresholds were identified through review of regulations and statutes, published guidance documents for PRTR filers, and other published and unpublished PRTR specific materials. These thresholds were then included for each PRTR and chemical in the Long and Short Chemical Lists.

¹¹ Note that non-chemical specific regulations that limit the facilities that are required to report to PRTRs were identified, but not included in the Long Reporting Sector List. These regulations include:

Exemptions based on type of facility (e.g., stationary, mobile),
Sector-specific thresholds,

Exemptions for equipment (e.g., structural components of a facility),

Exemptions for items produced by the facility (e.g., articles),

Activity exemptions (e.g., research and development within a production facility),

Hazardous waste transfer thresholds, and

Employee thresholds that apply to all chemicals within a PRTR.

Table 9. Chemical-specific Thresholds by PRTR

PRTR /Kyiv Protocol	Chemical-Specific Thresholds
Australia – NPI	<p>The thresholds that apply to a chemical vary by chemical category:</p> <p>Usage: If the handling, manufacture, import, processing, coincidental production or other use of a Category 1, 1a, or 1b chemical exceeds the usage threshold, a covered facility must report the chemical.</p> <p>Fuel combusted: If the amount of fuel and/or waste burnt during the reporting year exceeds the annual combustion threshold, or if the amount of fuel and/or waste burnt in any hour during the reporting year exceeds the hourly combustion threshold for Category 2a or 2b, then a covered facility must report all substances listed under the Category.</p> <p>Energy use: If a covered facility uses electricity in excess of the energy use threshold for purposes other than lighting or motive purposes, it must report any emissions of all substances listed under Category 2b.</p> <p>Power rating: If a covered facility has a power rating in excess of the power rating threshold for purposes other than lighting or motive purposes, it must report any emissions of all substances listed under Category 2b.</p> <p>Emissions/transfers: If a covered facility emits or transfers at least one Category 3 chemical in excess of the emissions/transfers threshold for that chemical, the facility is required to report emission and transfers for all Category 3 chemicals. Emissions and transfers that count toward this threshold include the amount of the chemical emitted to water (excluding groundwater); transferred to a mandatory reporting transfer destination; and emitted to water and transferred to a mandatory reporting transfer destination.</p>
Canada – NPRI	<p>The thresholds that apply to a chemical vary by chemical category:</p> <p>Manufacture, process, or otherwise use: If the quantity of a Part 1A or 1B chemical manufactured, processed, or otherwise used exceeds the threshold for that chemical, all releases, disposals, and transfers for recycling of that chemical must be reported.</p> <p>Concentration: For Part 1A and 1B chemicals, quantities manufactured, processed, or otherwise used only need to be counted towards their thresholds if they exist in concentrations above their concentration thresholds. This threshold does not apply (chemical quantities must be counted toward the manufacture, process, or otherwise use thresholds regardless of concentration) for chemical quantities contained in tailings, contained in waste rock or that were incidentally manufactured as byproducts.</p> <p>Release, disposal, or transfer for recycling: The threshold for Part 2 substances is based on the total quantity of Part 2 substances released, disposed of, or transferred for recycling as a result of incidental manufacture or from the generation of tailings. If a covered facility exceeds this threshold, then all individual Part 2 substances must be reported.</p> <p>Activity: Part 3 chemicals must be reported if a covered facility engages in one of a specified list of covered activities. For some of these activities, facilities must report regardless of the employee threshold (see Annex 1).</p> <p>Air release: Part 4 chemicals must be reported if the quantity of that chemical released to air exceeds the air release threshold. Part 5 substances must be reported if both the quantity of that substance released to air exceeds the air release threshold and the sum of all Part 4 chemicals released to air exceeds 10 tonnes.</p>
EU – E-PRTR	<p>Air releases: Covered facilities must report air releases for a chemical if the quantity of that chemical released to air exceeds its air release threshold.</p> <p>Water releases: Covered facilities must report water releases for a chemical if the quantity of that chemical discharged exceeds its water release threshold. In addition, covered facilities must report transfers destined for waste-water treatment if the quantity of the chemical transferred for waste-water treatment exceeds its water release threshold.</p> <p>Land releases: Covered facilities must report land releases for a chemical if the quantity of that chemical released to land exceeds its land release threshold.</p> <p>Note: Covered facilities must report waste transfers of hazardous waste if the amount of hazardous</p>

PRTR /Kyiv Protocol	Chemical-Specific Thresholds
	waste transferred off site exceeds 2 tons. In addition, covered facilities must report waste transfers of other waste if the amount of other waste transferred off site exceeds 2 000 tons. E-PRTR waste transfer thresholds are not included in the Long and Short Chemical Lists; these thresholds are not chemical-specific.
Kyiv Protocol	<p>The Kyiv Protocol recommends that national-level PRTRs be designed such that the chemical reporting thresholds be based either on 1) quantities of the chemical released and transferred by media; or 2) quantities of the chemical manufactured, processed, or used.</p> <p>For PRTRs with chemical reporting thresholds based on quantities of the chemical released and transferred by media, the following reporting thresholds are recommended:</p> <p>Air releases: Covered facilities must report air releases for a chemical if the quantity of that chemical released to air exceeds its air release threshold.</p> <p>Water releases: Covered facilities must report water releases for a chemical if the quantity of that chemical discharged exceeds its water release threshold. In addition, covered facilities must report transfers of a chemical destined for waste-water treatment if the quantity of the chemical transferred for waste-water treatment exceeds its water release threshold.</p> <p>Land releases: Covered facilities must report land releases for a chemical if the quantity of that chemical released to land exceeds its land release threshold.</p> <p>Off-site transfers: PRTRs may elect to use one of two options available for off-site waste transfers thresholds:</p> <p>Threshold for off-site transfers of pollutants: Covered facilities must report off-site transfers for a chemical if the quantity of the chemical transferred off-site exceeds its off-site transfer threshold. This threshold is included in the Long and Short Chemical Lists in the Excel file associated with this report.</p> <p>Thresholds for off-site transfers of hazardous waste and other waste: Covered facilities must report waste transfers of hazardous waste if the amount of hazardous waste transferred off site exceeds 2 tons. In addition, covered facilities must report waste transfers of other waste if the amount of other waste transferred off site exceeds 2 000 tons. These thresholds are not included in the Long and Short Chemical Lists; they are not chemical-specific.</p> <p>For PRTRs with chemical reporting thresholds based on quantities manufactured, processed, or used:</p> <p>Manufacture, process, or use: Covered facilities must report all releases and transfers for a chemical if the quantity of the chemical manufactured, processed, or used exceeds the manufacture, process, or use threshold for the chemical.</p>
Japan – PRTR	<p>Usage: Covered facilities must report all releases and transfers of a given chemical if the sum of the quantity manufactured, the quantity used and other quantities of that chemical exceeds the usage threshold.</p> <p>Concentration thresholds: Chemicals in materials at levels below the concentration thresholds are not counted towards the usage threshold.</p> <p>Note: If a facility meets specific requirements (e.g., covered under the Mine Safety Law, sewage disposal facilities, domestic waste disposal facilities, industrial waste disposal facilities, specific facilities under the Act on Special Measures against Dioxins), then all covered chemicals must be reported regardless of their quantity or concentration.</p>
US – TRI	<ul style="list-style-type: none"> • Manufacture, process, or otherwise use thresholds: Covered facilities must report a chemical if they manufacture the chemical in quantities above the manufacturing threshold for the chemical, process the chemical in quantities above the processing threshold for the chemical, or otherwise use the chemical in quantities above the otherwise use threshold for the chemical. • Concentration Thresholds: The de minimis exemption allows facilities to disregard certain minimal concentrations of chemicals in mixtures when making threshold determinations and release and other waste management calculations. If the chemical is not a “chemical of special concern” and is present in a mixture below the appropriate de minimis level, all releases and

PRTR /Kyiv Protocol	Chemical-Specific Thresholds
	other waste management activities associated with the chemical in that mixture are exempt from TRI reporting.

Sources:

- Australian Government. (2019), National Pollutant Inventory: Substance list and thresholds, www.npi.gov.au/substances/substance-list-and-thresholds accessed 29 March 2021.
- Environment and Climate Change Canada (2021c). Substance list: National Pollutant Release Inventory, <https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/substances-list/threshold.html> accessed 29 March 2021
- European Commission (2006a), Guidance Document for the Implementation of the European PRTR, http://prtr.ec.europa.eu/docs/EN_E-PRTR_fin.pdf.
- Government of Japan. Ministry of the Environment (2004), Manual for PRTR Release Estimation Methods. www.env.go.jp/en/chemi/prtr/manual/ accessed 6 August 2012.
- UNECE (United Nations Economic Commission for Europe) (2008), Guidance on Implementation of the Protocol on Pollutant Release and Transfer Registers, www.unece.org/fileadmin/DAM/env/pp/prtr/guidance/PRTR_May_2008_for_CD.pdf accessed 15 August 2012.
- U.S. EPA (2021a), Toxic Chemical Release Inventory Reporting Forms and Instructions. Revised 2020 Version. EPA 260-R-10-001, <http://www2.epa.gov/sites/production/files/documents/ry2010rfi.pdf> accessed 17 March 2021.

In addition to the variation in types of thresholds across PRTRs and chemicals, the values at which thresholds were set vary considerably across PRTRs. For example, air release thresholds for chemicals on the long list vary between 0.001 kg and 100 000 000 kg across chemicals and PRTRs. Similarly, manufacture, process, and use thresholds vary between 0.0001 and 25 000 kg across chemicals and PRTRs. It is interesting to note that reporting thresholds are consistently low across multiple PRTRs for a handful of chemicals. For example, mercury compounds have low manufacture, process, and use thresholds under Australia's NPI, Canada's NPRI, the Kyiv Protocol, and the United States' TRI.

5.2. Reporting frequency

To increase the analytical value of the Long and Short Chemical Lists, chemical coverage across PRTRs was augmented with information about how many facilities report for each chemical. This information can be used to measure the prevalence of each chemical in the reviewed PRTRs. In addition, countries considering which chemicals to cover under a new PRTR might use this information to predict reporting frequency for chemicals. For example, a country might expect more reports for a chemical covered by 4 PRTR systems and has high reporting in each system than for a chemical covered by 5 PRTR systems and has low reporting in each system. However, the variability in industrial use of chemicals across countries should also be considered when predicting reporting for new PRTRs or for chemical additions to existing PRTRs.

The number of facilities reporting the chemical for the most recent year available was compiled for each chemical in the Long and Short Chemical Lists (2019/2020 for Australia, 2019 for Canada and the U.S., 2017 for E-PRTR and Japan). Note that reported quantities of releases, transfers, and waste management were not considered; different chemicals have different impacts on environmental and human health, so a small release of a high toxicity chemical may be of more concern than a large release of a lower toxicity chemical.

To allow for comparison across PRTRs, the number of facilities reporting each chemical was converted into a reporting score. Within each PRTR, covered chemicals were assigned a score ranging from 0 to 3:

- **0 (not reported):** No facilities reported the chemical.

- **1 (low reporting):** The chemical was in the bottom quartile of reported chemicals (i.e., chemicals with no facilities reporting were not included in quartile calculations).
- **2 (medium reporting):** The chemical was above the bottom quartile and below the top quartile.
- **3 (high reporting):** The chemical was in the top quartile.

These facility counts are shown for each PRTR in Table 10 and Table 11. The number of facilities reporting each chemical ranged from 0 to 18 562 facilities across chemicals and PRTRs (Table 10). The distributions of facilities reporting across chemicals indicate that, in general, chemicals on the Short Chemical List were reported more frequently than the full set of chemicals on the Long Chemical List (

Table 11).

Table 10. Distribution of Number of Reporters across Chemicals Covered by PRTRs

PRTR	Distribution of # Facilities Reporting a Chemical								
	Across Long Chemical List				Across Short Chemical List				
	Min.	Low reporting	Medium Reporting	High Reporting	Min.	1 st Q	Median	3 rd Q	Max.
Australia NPI	0	1-58	59-906	907-3219	0	109	263	947	2065
Canada NPRI	0	1-3	4-61	62-4585	0	8	47	234	4585
EU – E-PRTR	0	1-8	9-436	437-7296	0	9	95	470	7296
Japan PRTR*	0	1-3	4-53	54-18 562	0	41	269	670	18 562
U.S. – TRI**	0	1-3	4-53	54-3921	0	22	103	527	7664

Note: Quartiles were calculated excluding chemicals with no reporting (0 facilities).

* The upper end of the distributions for Japan's PRTR show considerably higher counts of facilities than the other PRTRs included in this table. This pattern appears to be driven by the retail fuel industry. For example, 13 126 of the 15 765 facilities that reported ethylbenzene to Japan's PRTR were in the retail fuel industry. This sector is not covered by the other four PRTRs.

** In the U.S. TRI, the short list chemical with the most facilities reporting is "lead and lead compounds." This counts facilities reporting lead, lead compounds, or both. 3921 facilities reported for lead and 3800 facilities reported for lead compounds in reporting year 2019, with some facilities reporting both.

Source:

Australian Government: Data.gov.au. (2020), National Pollutant Inventory. <https://data.gov.au/dataset/ds-dga-043f58e0-a188-4458-b61c-04e5b540aea4/details> accessed 29 March 2021.

Government of Canada (2020). Single year data tables by facility – releases, transfers and disposals - NPRI-INRP_DataDonnées_2019.xlsx. <https://open.canada.ca/data/en/dataset/1fb7d8d4-7713-4ec6-b957-4a882a84fed3/resource/9aa74536-3f4e-4679-8d69-3ceab3a6b109> accessed 19 July 2021.

EEA (European Environmental Agency) (2019). European Pollutant Release and Transfer Register (EPRTR) - Microsoft Access database and text format: eprtr_v17_mdb, <https://www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-22>Government of Japan: Ministry of the Environment, Environmental Health Department, Environmental Health and Safety Division (n.d.b), PRTR Data Page: Compiled Data Page. www2.env.go.jp/chemi/prtr/prtrinfor/contents/e-table.jsp, accessed 19 July 2021.

U.S. EPA (2020), TRI Explorer. 2019 National Analysis Dataset released October 2020. Accessed 19 July 2021.

Table 11. Variation in Reporting Frequency among Long and Short List Chemicals

Highest Reporting Frequency across All PRTRs	Long List Chemicals		Short List Chemicals	
	Count		Percent	Count
High Reporting	210	17%	44	34%
Medium Reporting	414	33%	56	46%
Low Reporting	201	16%	11	9%
Not Reported	447	35%	13	10%
Total	1 272	100%	124	100%

Note: For Reporting Year 2020, the US TRI added 172 unique PFAS chemicals. Reporting statistics are based on 2019 TRI data, which did not include these pollutants, increasing the number of pollutants that are not reported by 172.

5.3. Addition of other PRTRs

PRTRs have been established in Chile, Israel, Korea, and Mexico. These PRTRs were not included in the original development of the Long Chemical List. To further the global utility of the Harmonized Chemical Lists, information on the chemicals reported by these PRTRs was added as supplemental data. Difficulties in data access, such as limited availability of official documentation published in English, limited the ability to analyse chemical listings in the level of detail required of the five PRTRs comprising the original list. Further, the PRTRs of Chile and Israel are relatively new and represent relatively small economies compared to the other PRTRs. The Working Party on PRTRs determined adding these four PRTRs as supplemental information was the most appropriate action for this update.

The PRTRs of Chile, Israel, Korea, and Mexico do not publish chemical lists in English. Chemical lists were obtained from contacts at the PRTRs of Chile, Israel, and Korea; the chemical list for Mexico was obtained in English from the Commission for Environmental Cooperation, an organisation that works closely with the North American PRTRs and maintains a comparative list of chemicals reported to the PRTRs of the U.S., Canada, and Mexico in English, French, and Spanish. Where possible, original lists in each PRTR's native language were used to confirm details (such as inclusion of metal compounds in a listing for a metal), using a combination of CAS numbers, staff members with proficiency in the language, and translation software (i.e., Google Translate).

Chemicals listed on these PRTRs were indicated on the Harmonised Lists. Chemicals listed on these PRTRs that are not listed on any of the original PRTRs used for developing the Long Chemical List were not added to the Long Chemical List.

Every effort was undertaken to ensure correct characterisation and comparison of chemical lists; however, the translated lists used are not official, and errors could be introduced. The introduction of data from these four PRTRs is intended to provide guidance on reporting in PRTRs beyond the five PRTRs originally used for development of the Harmonised Lists and should not be considered definitive. In particular, details of chemical groups and individual members of chemical groups may not be perfectly translated.

Notes on Supplemental PRTRs

- The chemical list provided for Korea lists members of chemical categories, although data for chemical categories is reported at the category level. For example, Zinc oxide (CAS 1314-22-3) is listed on the chemical list as a zinc compound, but releases for zinc oxide are reported as part of the "zinc and its compounds" category. Due to translation difficulties, all chemicals included in Korea's list with CAS numbers are marked as covered on the Harmonized List, even if they are not individually reported.

- Israel was unable to provide CAS numbers for their chemical list. Israel's chemical list is similar to the E-PRTR/Kyiv protocol lists; many names had an exact match to an E-PRTR/Kyiv name, which was used to identify the chemical's CAS number and Harmonised ID. The remaining chemicals were manually matched to the Long Chemical List based on chemical names.
- Caution is warranted for chemical categories and groups, as these are particularly vulnerable to mistranslation. In general, coverage of chemical categories is assumed to be correct in translated chemical lists, even when this causes some unexpected differences in coverage. For example, the list provided by Chile has two listings for some metals, such as "lead" and "lead compounds," while other metals are listed only as the parent metal, e.g., "nickel" only, and some are listed in the format "metal, metal compounds." These translations were interpreted literally although that indicates an unusual inconsistency between reporting of different metals, unlike other PRTRs.

6. UPDATE OF THE HARMONISED LIST OF POLLUTANTS

The Long Chemical list was updated with changes made to the chemical lists of Canada and the U.S., and the POPs list. Both Canada's NPRI and the U.S. TRI have added chemicals to their reporting lists and Canada's NPRI has removed chemicals. These PRTRs publish the lists of reportable chemicals in advance, so that the chemicals included in the most recent available data (i.e., Reporting Year 2019) may not exactly match the chemicals on the most recent list of reportable chemicals. For these PRTRs, all chemicals reportable in the most recent data year, as well as all chemicals reportable in the most recent list of reportable chemicals, were included. Key changes made include:

- For Canada, changes included the addition of 10 new chemicals, the removal of 52 chemicals from Part 1a and Part 5 reporting, changes in reporting thresholds for certain chemicals, and other modifications such as name changes and changes to include additional isomers.
- For the U.S., chemicals were added to the reporting list; no other changes were made to the list. The chemicals added were *o*-nitrotoluene, nonylphenol and nonylphenol ethoxylate categories, 1-bromopropane, hexabromocyclododecane category, and 172 individually listed PFAS chemicals.
- Updated the POPs list to include [16 additional POPs added to the Stockholm convention as of 2016](#).

Japan is implementing changes to their list of substances subject to the PRTR reporting that will go into effect in 2023 for reporting in 2024. The revised list was not available when the harmonised lists were being updated, therefore, the changes could not be included in this version of the harmonised list of pollutants.

A review of E-PRTR implementation was completed in 2020 that looked at the industrial activities and pollutants within the scope of the E-PRTR regulation. One potential outcome could be changes to the list of pollutants reported. Changes were not yet proposed when the harmonised lists were updated, therefore, changes could not be included in this version of the harmonised list of pollutants.

No changes to Australia's chemical list have been made or are known to be in progress since 2007.

As described in Section 5.3, the pollutant lists of several additional PRTRs were incorporated into the Long and Short Chemical Lists for reference. These are the pollutant lists from the PRTRs of Chile, Israel, Korea, and Mexico. As noted, while these lists are now included for reference, they were not included in the criteria for selecting which pollutants are on the Short Chemical List.

As part of the update to the harmonised list of pollutants, additional improvements were made. These changes increase the accuracy, completeness, and usability of the list. The 2014 *Proposal for a harmonised list of pollutants* detailed challenges encountered when comparing chemical coverage among PRTRs; many of these challenges apply to updating and revising the lists. The primary challenges are in harmonising chemicals without CAS numbers (such as chemical groups) and in aligning groups in the Long Chemical List so as to include an appropriate level of detail and distinction between chemical groups.

New detail was added to this updated version of the harmonised list to help capture the distinctions between PRTRs:

- The chemical name as listed on each PRTR was added. This helps capture the differences between PRTRs where the listed chemicals may have slight distinctions or exemptions. For example, the

U.S. listing for chromium compounds excludes hydrochloric acid that is not in the aerosol form; this detail is included in the U.S. chemical name. Including the chemical name that is used in each PRTR may also assist users in searching for data in a PRTR, as PRTRs frequently use different names for the same chemical.

- New formatting was added to the PRTR coverage columns. Previously, the formatting in this table allowed for a chemical to be marked as either covered ('X') or not covered (blank). The new formatting adds additional symbology:
 - 'C' indicates the pollutant is covered as part of a category, but not individually listed by the PRTR, meaning reporting is required for that pollutant, but not at the pollutant-level.
 - 'P' indicates the pollutant is a mixture or group (including groups of isomers) which is partly covered by the PRTR. For example, the 'trichlorobenzenes' group is marked as 'P' for the U.S., where only certain trichlorobenzene isomers are reportable.
 - 'M' indicates a group that is not specifically covered by the PRTR, but where all members of the group are reportable to the PRTR. For example, many metal and metal compounds listings are noted as 'M' for the U.S., which does not have a category for any metal together with its metal compounds, but instead lists separately the parent metal and compounds of that metal.¹²
 - 'I' denotes a pollutant that is not included on the country's PRTR but is tracked in a different inventory system, such as is the case for greenhouse gasses in several countries.
- A new 'group/category' flag was added marking pollutant listings corresponding to groups or categories. This will help users understand the harmonised list. The "group/category" flag was applied when relevant, such as when individual members of the group are also listed. The flag was not applied to mixtures of isomers unless specific isomers were listed by at least one PRTR.

In addition to updating the list, the list was reviewed for accuracy and completeness. The following changes were made:

- Corrected certain incorrect and inconsistently formatted CAS numbers and pollutant names.
- Consolidated duplicate or similar listings where possible, i.e., where the listings were very similar and the differences could be captured in the chemical name.
- Added pollutants that were erroneously omitted from the prior version of the list.
- Changed chemical categories for certain pollutants, especially for inorganic substances listed in the "other gasses" category which are not normally in gas form (such as water-soluble salts of bromic acid).
- Some CAS numbers were corrected for the harmonised list.
- "All isomers" qualifier for cycloheptane and cyclooctane was removed from the names of cycloheptane and cyclooctane, which do not have isomers. CAS numbers were added for these pollutants and for cyclohexene (the CAS number for cyclohexene is for the cis isomer; the trans isomer is expected to be very unstable in environmental conditions)
- New Stockholm Convention POPs were added.
- Unique record identifiers (IDs) were assigned to pollutants if a CAS number is not available or is inappropriate (e.g., halons). These IDs are stored in the CAS ID field and are now formatted consistently; all use "LCL-#" (referring to Long Chemical List). Pollutants that were included in the previous version of the Long Chemical List already had IDs, and these IDs were not changed; new IDs were created for newly added pollutants lacking CAS numbers.

¹² Facilities reporting to the TRI which manufacture, process, or otherwise use both a parent metal and compounds of that metal may report all data together as compounds of that metal.

Certain chemicals, including both newly added chemicals and existing chemicals, could be categorised as belonging to more than one category or group. For example, Chromium(III) perfluorooctanoate could be classed as a chromium compound or as belonging to the “PFOA, its salts, and related compounds” category. Any chemical meeting the definition of a POP category was considered to belong to that POP category. For other chemicals meeting more than one category definition, expert judgment was used to determine the most appropriate classification for the chemical; where applicable, these chemicals were considered to give the PRTR “P” (partial) coverage for both categories.

The Long Chemical List was then further reviewed through comparison to resources such as: environmental regulations and statutes, published guidance documents for PRTR filers, and other published and unpublished PRTR specific materials. Any remaining inconsistencies identified in the Long and Short Chemical Lists were resolved.

7. NOTES ON GROUPING OF POLLUTANTS

In the course of comparing chemicals coverage among PRTRs to create the Long and Short Chemical Lists, the following chemical definitions were found to vary considerably across PRTRs. Differences were resolved through discussions with the representatives of the PRTR systems and best professional judgement.

7.1. Polychlorinated dioxins and furans

The considered PRTR systems define polychlorinated dioxins and furans as follows:

- Australia: Polychlorinated dioxins and furans (TEQ)
- Canada: Polychlorinated dioxins and furans are reported in units of mass, (e.g., "grams") for each specific congener. This allows the flexibility to convert the congener quantity details in both I-TEQ and World Health Organization (WHO) TEQ.
- E-PRTR: The E-PRTR indicates polychlorinated dioxins and furans as TEQ.
- Japan: Based on the study by WHO, dioxins are defined to include PCDDs, PCDFs and co-planar PCBs in the Law Concerning Special Measures against Dioxins. The same definition is used in the Japanese PRTR system.
- U.S.: Dioxin and Dioxin-Like Compounds (Manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacturing of that chemical). This category includes 17 individual chemicals as listed in the United States Environmental Protection Agency (2021a).

For the Short Chemical List, the term Polychlorinated dioxins and furans is used.

7.2. Metals

Metals are considered in the different PRTR systems as follows (for chromium and its compounds see Section 7.3):

- Australia: The amount emitted in relation to a substance listed as [metal] & compounds refers only to the amount of the metal emitted (for example, the amount of Lead & compounds emitted refers only to the amount of Lead emitted).
- Canada: Total of the pure element and the equivalent weight of the element contained in any compound, alloy or mixture.
- E-PRTR: All metals shall be reported as the total mass of the element in all chemical forms present in the release.
- Japan: Some metals are presented as [metal] and its compounds (i.e., all forms); some metals have separate listings for the metal and metal compounds, or for specific compounds.
- U.S.: Metals are indicated as specific entries. Moreover, corresponding metal compound categories are also listed, e.g., the listing for cadmium compounds includes any unique chemical substance

that contains cadmium as part of that chemical's infrastructure. For the metal compound categories, release and waste management quantities reported refer only to the weight of the parent metal.

For the Short Chemical List, the term used for metals includes the metal name, the phrase "and compounds as," and symbol for the elemental metal. For example, "cadmium and compounds (as Cd)" is listed on the Short Chemical List. It includes cadmium and any unique chemical substance that contains cadmium as part of that chemical's infrastructure.

7.3. Chromium and its compounds

Chromium and its compounds are considered in the different PRTR systems as follows:

- Australia: Chromium(III) compounds and Chromium(VI) compounds are listed separately. The amount emitted in relation to a substance listed as [metal] & compounds refers only to the amount of the metal, as Cr(III) or Cr(VI), emitted. Elemental chromium–Cr(0)–and chromium in less common oxidation states are not reportable.
- Canada: A separate listing for hexavalent chromium was added to the NPRI for the 2002 reporting year with an alternate reporting threshold of 50 kg and 0.1% concentration. All other chromium and chromium compounds are reported separately from chromium(VI) compounds.
- E-PRTR: The E-PRTR lists only Chromium and compounds (as Cr), whereas all metals are reported as the total mass of the element in all chemical forms present in the release.
- Japan: As the toxicity of Chromium(III) and Chromium(VI) is quite different and both compounds are normally handled in a different way, elemental chromium and chromium(III) are listed separately from chromium(VI).
- U.S.: Different *de minimis* levels exist for Chromium(III) and Chromium(VI), 1 and 0.1%, respectively. All oxidation states of chromium are reported together as chromium compounds, and elemental chromium is reported either as "chromium" or optionally may be reported with chromium compounds for facilities which meet thresholds for both.

For the Short Chemical List, all chromium reporting is listed under "chromium and its compounds."

7.4. Hydrochlorofluorocarbons (HCFCs), chlorofluorocarbon (CFCs) and halons

Hydrochlorofluorocarbons (HCFCs), chlorofluorocarbon (CFCs) and halons are considered in the different PRTR systems as follows:

- Australia: Not included
- Canada: Total of all isomers reported as an aggregate of the individual isomers.
- E-PRTR: E-PRTR lists HCFCs, CFCs, and halons as three groups.
- Japan: In Japan, all the gasses defined in the Montreal Protocol are individually listed in the PRTR system.
- U.S.: Compounds are individually listed.

For the Short Chemical List, the following three terms are used (UNEP, 2005):

- Hydrochlorofluorocarbons (HCFCs) (substances including their isomers listed in Group I Annex C of the list of controlled substances under the Montreal Protocol).
- Chlorofluorocarbons (CFCs) (substances including their isomers listed in Group I Annex A and Group I Annex B of the list of controlled substances under the Montreal Protocol).

- Halons (substances including their isomers listed in Group II Annex A and Group I Annex E of the list of controlled substances under the Montreal Protocol).

These terms were selected because of the variability in substances covered by each PRTR and to limit the length of the Short Chemical List.

7.5. Polycyclic aromatic hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAHs) are considered in the different PRTR systems as follows:

- Australia: The amount of 'Polycyclic Aromatic Hydrocarbons (Benzo[a]pyrene equivalent) (PAHs B[a]P_{eq})' emitted refers to the sum of the toxic equivalent amounts of the individual congeners emitted or transferred. Toxic equivalent amounts are obtained by multiplying the mass of the congener by the Toxicity Equivalency Factor.
- Canada: Depending on the information that is available, there are three ways to report PAHs:
 - If information on releases, disposals and transfers for recycling for individual PAHs is available, those PAHs that are released, disposed of or transferred for recycling in quantities ≥ 5 kg must be reported individually.
 - If only a combination of information on individual and total PAHs is available, quantities of individual PAHs in quantities ≥ 5 kg and quantities of "total unspciated PAHs" should both be reported.
 - If the only available information is for total PAHs, "total unspciated PAHs" should be reported.
- E-PRTR: Polycyclic aromatic hydrocarbons (PAHs) are to be measured for reporting of releases to air as benzo(a)pyrene (50-32-8), benzo(b)fluoranthene (205-99-2), benzo(k)fluoranthene (20708-9), indeno(1,2,3-cd)pyrene (193-39-5). Other compounds are individually listed.
- Japan: In the Japanese PRTR system chemicals normally released unintentionally are rarely included. Therefore, PAHs are limited in the PRTR system to chemicals intentionally used and therefore listed individually.
- U.S.: Some compounds are individually listed and a category Polycyclic aromatic compounds (PACs) with individual components also exists.

For the Short Chemical List, individual substances present in at least four of the different PRTR systems are included (i.e., Anthracene and Naphthalene).

7.6. Benzene, toluene, ethylbenzene and xylene (BTEX)

The monoaromatic hydrocarbons benzene, toluene, ethylbenzene and the xylene isomers are considered in the different PRTR systems as follows:

- Australia: The NPI includes benzene, toluene, ethylbenzene and xylenes (individual or mixed isomers).
- Canada: NPRI includes benzene, toluene, ethylbenzene and xylenes (all isomers).
- E-PRTR: The E-PRTR includes benzene, toluene, ethylbenzene and xylenes (i.e., all isomers). Single pollutants are to be reported if the threshold for BTEX (the sum parameter of benzene, toluene, ethylbenzene, xylenes) is exceeded.
- Japan: Japan's PRTR includes benzene, toluene, ethylbenzene and xylene (i.e., all isomers).
- U.S.: TRI includes benzene, toluene, ethylbenzene, xylene (mixed isomers), *o*-xylene, *m*-xylene and *p*-xylene.

For the Short Chemical List, individual substances present in at least four of the different PRTR systems are included, i.e., benzene, toluene, ethylbenzene and xylene (mixed isomers).

REFERENCES

- Australian Government. Department of Agriculture, Water and the Environment (n.d.), *Stockholm Convention on Persistent Organic Pollutants (POPs)*, www.environment.gov.au/settlements/chemicals/international/index.html accessed 29 March 2021.
- Australian Government. Department of Agriculture, Water, and the Environment (2015). *National Pollutant Inventory Guide. Version 6.1. September 2015*, Canberra.
- Australian Government. Department of Agriculture, Water and the Environment (2014), *NPI Data*, www.npi.gov.au/npi-data accessed 29 March 2021.
- Australian Government. Department of Industry, Science, Energy and Resources (2021), *Tracking and reporting greenhouse gas emissions*, <https://www.industry.gov.au/policies-and-initiatives/australias-climate-change-strategies/tracking-and-reporting-greenhouse-gas-emissions> accessed 29 March 2021.
- Australian Government. Department of Agriculture, Water and the Environment (2019), *National Pollutant Inventory: Substance list and thresholds*, www.npi.gov.au/substances/substance-list-and-thresholds accessed 29 March 2021.
- Australian Government: Data.gov.au. (2020), *National Pollutant Inventory*. <https://data.gov.au/dataset/ds-dga-043f58e0-a188-4458-b61c-04e5b540aea4/details> accessed 29 March 2021.
- Berg, M. Van den, et al. (2006), “The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds”, *Toxicological Sciences*, Vol. 93. No. 2., Oxford University Press, Oxford, pp. 223-241.
- Boyce, B. (2010), *Comparability of Pollutants in Global PRTR*, paper presented at OECD Task Force Meeting, Paris, 19 - 21 May.
- Environment and Climate Change Canada (2019). *Greenhouse gas reporting: facilities*, <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting.html> accessed 29 March 2021.
- Environment and Climate Change Canada (2020a), *Guide for Reporting to the National Pollutant Release Inventory (NPRI) 2020 and 2021: The Canada Gazette Notice – The legal basis for the NPRI*, Environment Canada, Gatineau, http://publications.gc.ca/collections/collection_2020/eccc/En81-1-2020-eng.pdf.
- Environment and Climate Change Canada (2020b). *Canada’s official greenhouse gas inventory*, <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html> accessed 29 March 2021.
- Environment and Climate Change Canada (2021a), *National Pollutant Release Inventory*

(NPRI) Database – all data for all years (March 12, 2021 version), <https://open.canada.ca/data/en/dataset/06022cc0-a31e-4b4c-850d-d4dccda5f3ac>, accessed 29 March 2021.

Environment and Climate Change Canada (2021c). Substance list: National Pollutant Release Inventory, <https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/substances-list/threshold.html> accessed 29 March 2021.

European Commission (2000), *Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer (O.J. L 244, 29.9.2000)*, European Commission, Brussels.

European Commission (2003), *Regulation (EC) No 1804/2003 of the European Parliament and of the Council of 22 September 2003 amending Regulation (EC) No 2037/2000 as regards the control of halon exported for critical uses, the export of products and equipment containing chlorofluorocarbons and controls on bromochloromethane (O.J. L 265, 16.10.2003)*, European Commission, Brussels.

European Commission (2006a), *Guidance Document for the Implementation of the European PRTR*, http://prtr.ec.europa.eu/docs/EN_E-PRTR_fin.pdf.

European Commission (2006b), *Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC (O.J. L 33, 4.2.2006)*, European Commission, Brussels.

EEA (European Environmental Agency) (2019). *European Pollutant Release and Transfer Register (EPRTR) - Microsoft Access database and text format: eprtr_v17_mdb*, <https://www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-22> accessed 23 May 2019.

EEA (n.d.), *European Pollutant Release and Transfer Register*, <https://prtr.eea.europa.eu/#/home> accessed 29 April 2021.

Government of Canada (2010), *Notice with respect to substances in the National Pollutant Release Inventory for 2010*, <https://gazette.gc.ca/rp-pr/p1/2010/2010-12-11/pdf/g1-14450.pdf>, Canada Gazette, Public Works and Government Services Canada, Gatineau, Quebec.

Government of Canada (2020). *Single year data tables by facility – releases, transfers and disposals - NPRI-INRP_DataDonnées_2019.xlsx*. <https://open.canada.ca/data/en/dataset/1fb7d8d4-7713-4ec6-b957-4a882a84fed3/resource/9aa74536-3f4e-4679-8d69-3ceab3a6b109> accessed 19 July 2021.

Government of Japan. Ministry of the Environment (2004), *Manual for PRTR Release Estimation Methods*. www.env.go.jp/en/chemi/prtr/manual/ accessed 19 July 2021.

Government of Japan. Ministry of the Environment (2005), *National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants*.

www.env.go.jp/chemi/pops/plan/en_full.pdf accessed 19 July 2021¹³.

Government of Japan. Ministry of the Environment (2010), *Recent Progress in PRTR in Japan*, presented at the 13th TFPTR Meeting, the same information is available at:
www.env.go.jp/en/chemi/prtr/documents/pdf/prtr_Japan_2010.pdf

Government of Japan. Ministry of the Environment (n.d.a), *PRTR Information Plaza Japan*.
www.env.go.jp/en/chemi/prtr/prtr.html accessed 18 November 2011.

Government of Japan. Ministry of the Environment, Environmental Health Department, Environmental Health and Safety Division (n.d.b), *PRTR Data Page: Compiled Data Page*. www2.env.go.jp/chemi/prtr/prtrinfo/contents/e-table.jsp, accessed 13 August 2012.

Greenhouse Gas Inventory Office of Japan and Ministry of the Environment, Japan (eds.), *National Greenhouse Gas Inventory Report of JAPAN 2020*, Center for Global Environmental Research, National Institute for Environmental Studies, Japan, 2020.

Government of Japan (2006), *Order for Enforcement of the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof* (Cabinet Order No. 138 of March 29, 2000). Last revised by: Cabinet Order No. 356 of November 21 2008 (English translation in compliance with the Standard Bilingual Dictionary, August 2006 edition), Tokyo.

NIES (National Institute for Environmental Studies) (2013), *Greenhouse Gas Inventory of Japan*, wwwgio.nies.go.jp/, accessed 21 October 2013.

UNECE (United Nations Economic Commission for Europe) (2008), *Guidance on Implementation of the Protocol on Pollutant Release and Transfer Registers*, www.unece.org/fileadmin/DAM/env/pp/prtr/guidance/PRTR_May_2008_for_CD.pdf accessed 19 July 2021.

UNECE (n.d.), *Introduction to the Kyiv Protocol on Pollutant Release and Transfer Registers*, <https://unece.org/env/pp/protocol-on-prtrs-introduction> accessed 19 July 2021.

UNEP (United Nations Environment Programme) (2005), *Production and Consumption of Ozone Depleting Substances under the Montreal Protocol 1986 – 2004*, UNEP, Geneva.

UNEP (2010), *Stockholm Convention on Persistent Organic Pollutants (POPs) as amended in 2009*, August 2010.

U.S. EPA (2020), *TRI Explorer*. 2019 National Analysis Dataset released October 2020. Accessed 19 July 2021.

U.S. EPA (2021a), *Toxic Chemical Release Inventory Reporting Forms and Instructions. Revised 2020 Version*. EPA 260-R-10-001, <http://www2.epa.gov/sites/production/files/documents/ry2010rfi.pdf> accessed 17 March 2021.

U.S. EPA (2021b), *Greenhouse Gas Reporting Program*, www.epa.gov/ghgreporting/ accessed 29 April 2021.

¹³ The National Implementation Plan was modified in August 2012, which is available at http://www.env.go.jp/chemi/pops/plan/en_full-re.pdf

ANNEX 1. ACTIVITIES THAT REQUIRE REPORTING OF PART 3 CHEMICALS UNDER THE CANADIAN NPRI

Activities that Require Reporting of Part 3 Chemicals under the Canadian NPRI

Employee Threshold?	Activity
Employee Threshold Does Not Apply	<p>Non-hazardous solid waste incineration of ≥ 26 tonnes of waste, including conical burners and beehive burners</p> <p>Biomedical or hospital waste incineration of > 26 tonnes of waste</p> <p>Hazardous waste incineration</p> <p>Sewage sludge incineration</p> <p>Wood preservation using pentachlorophenol</p> <p>Facilities classified under the NAICS Canada code 211110 (Oil and gas extraction, except oil sands) excluding compressor stations, with less than 20 000 employee hours, must report for all criteria air contaminants (CAC) and benzene from all sources if the reporting threshold for at least one CAC is met. Light and medium crude oil batteries of an oil throughput equal to or greater than 1900 m³ per year must report volatile organic compounds and benzene emissions from storage tanks, regardless of whether air release thresholds are met.</p>
Employee Threshold Applies	<p>Base metals smelting (copper, lead, nickel or zinc only)</p> <p>Smelting of secondary aluminum</p> <p>Smelting of secondary lead</p> <p>Manufacturing of iron using a sintering process</p> <p>Operation of electric arc furnaces in steel foundries</p> <p>Operation of electric arc furnaces in steel manufacturing</p> <p>Production of magnesium</p> <p>Manufacturing of Portland cement</p> <p>Production of chlorinated organic solvents or chlorinated monomers</p> <p>Combustion of fossil fuel in a boiler unit, with a nameplate capacity of ≥ 25 megawatts of electricity, for the purpose of producing steam for the production of electricity</p> <p>Combustion of hog fuel originating from logs that were transported or stored in salt water in the pulp and paper sector</p> <p>Combustion of fuel in kraft liquor boilers used in the pulp and paper sector</p> <p>Titanium dioxide pigment production using the chloride process</p>

ANNEX 2. HARMONISED LIST OF POLLUTANTS (LONG AND SHORT CHEMICAL LISTS)

The Harmonised list of pollutants (Long and Short Chemical lists) in an Excel format is available on the OECD PRTR website.