

## EXECUTIVE SUMMARY

In 2002, the GEF/UNEP Pilot Project “Development of a National Implementation Plan for the Management of Persistent Organic Pollutants in Chile”, which includes activities destined to fulfill the obligations of the Stockholm Convention, was initiated. One of the issues included in the project was the preparation of a National Inventory of Dioxin and Furan Sources, which was prepared by the Technological Development Unit of the University of Concepción, with the coordination, guidance, and oversight of the National Coordinating Team. This inventory will serve as the basis for: (1) building the corresponding national action plan; (2) developing future national inventories; and (3) comparing the national inventory with those in other countries.

The present inventory is the first effort to determine the potential amount of dioxins and furans released in Chile. The main reference used in developing the inventory was the document “Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases,” (1st edition, May 2003). This document, drafted by the UNEP, provides a working methodology that allows for obtaining comparable results at the international level.

The inventory was prepared over approximately one year, at a total cost of USD50,000(excluding edition and printing), financed by the GEF/UNEP Project.

The following categories were analyzed for the inventory:

- 1 Waste incineration
- 2 Ferrous and non-ferrous metal production
- 3 Power generation and heating
- 4 Production of mineral products
- 5 Transport
- 6 Uncontrolled combustion processes
- 7 Production and use of chemicals, and consumer goods
- 8 Miscellaneous
- 9 Disposal
- 10 Hot spots

For the purpose of specifying more specific types of activities, each category was divided into subcategories. As each country has a great variety of activities, it is quite possible that these will not match those of other countries exactly. For this reason, the matrix used in this inventory is based on the proposed subcatego-

ries of UNEP’s “Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases,” and is aimed at standardizing information gathering on production levels to obtain values that are comparable with other inventories. Five sections have been identified where significant amounts of PCDD/PCDF may be released: (1) air (2) water (3) soil (4) products and (5) waste.

The quantification of potential sources of dioxin and furan emissions was carried out using the following methodological elements: surveys, visits to plants, interviews with experts, public authorities, company representatives and national association members.

Each national source identified was categorized according to the format proposed by the UNEP “Standardized Toolkit,” and the emission factors to be used were identified according to these categories. In those cases where a factor was considered non-applicable to Chile’s national scenario, an alternative emission factor was proposed.

The total amount of releases calculated for Chile was 85.608 g EQT/year. It was possible to estimate the levels of dioxins and furans released for all categories, according to the above mentioned document. However, some of the subcategories correspond to informal activities, which in this case are insignificant.

The analysis of collected data by category, region, and release source is shown in the table below:

### Releases by category at national level

Category	Release (g EQT/year)	Participation %
1 Waste incineration	15,239	17,8
2 Ferrous and non ferrous metals production	2,828	3,3
3 Power generation heating	19,170	22,4
4 Production of mineral products	0,292	0,3
5 Transport	2,794	3,3
6 Uncontrolled combustión proceses	31,905	37,3
7 Produccion and use of chemical and consumer goods	10,834	12,7
8 Miscellaneous	0,027	0,0
9 Disposal	2,519	2,9
<b>Total country</b>	<b>85,608</b>	<b>100,0</b>

As the above table shows, releases in the categories of “Waste incineration,” “Power generation and heating,” “Uncontrolled combustion processes,” and “Production and use of chemicals and consumer goods” are the most significant.

The main contributor to Category N° 1 is “Medical waste incineration.” Most hospitals in Chile having waste incineration do not control this process in any way. Incineration using a double combustion chamber with emission control is a rare practice within the country, and only three companies in the Metropolitan and VIII Regions use this technology.

The main contributor to Category N° 3 corresponds to “Cooking and domestic heating with biomass.” The most significant of these releases are found in the VII, VIII, IX, and X Regions.

In Category N° 6, “Agricultural burning of wastes” contributes the most, with 50% of all releases. The VIII and IX Regions have been observed to concentrate the largest percentage of these releases. Both Regions are among the most important for national agricultural activity.

“Pulp and paper production” is the main contributor to Category N° 7, centering its releases in the VIII Region, the location of most of the largest companies in this sector.

As shown in the following table, releases are concentrated in the central region of the country, between the V and X Regions, and mainly in the VIII, IX and X Regions. This is due to industrial and forestry activities, in which releases are generated by forest fires, forest and agricultural burning, pulp and paper mills, in addition to the combustion of biomass at residential and industrial levels due to resource availability.

#### Releases by region at national level

Region	Release (g EQT/year)	Participation %
I	1,438	1,7
II	1,718	2,0
III	2,063	2,4
IV	1,639	1,9

#### Participation by region at national level

Region	Liberations (g EQT/year)	Participation %
V	3,898	4,6
RM	7,465	8,7
VI	4,943	5,8
VII	4,365	5,1
VIII	23,954	28,0
IX	21,784	25,4
X	11,347	13,3
XI	0,691	0,8
XII	0,303	0,4
<b>Total country</b>	<b>85,608</b>	<b>100,0</b>

With respect to the different release routes, the following table shows that most releases are air emissions. This is because medical waste incineration processes contribute approximately 50% of all releases at the national level; cooking and domestic heating using biomass contributes 20%; energy generation through biomass power stations, and uncontrolled combustion processes, about 10% each.

#### Summary of release sources at national level

Release source	Release (g EQT/year)	Participation %
Air	51,710	60,4
Water	2,546	3,0
Land	16,871	19,7
Products	7,171	8,4
Wastes	7,311	8,5
<b>Country Total</b>	<b>85,608</b>	<b>100,0</b>

Finally, it is considered that the information provided in this inventory is sufficient for developing institutional strategies and an action plan. In this way, Chile can be seen as a country with environmental strategies within the international community, protecting both human health and natural resources for the future generations.