

Atmospheric Emission Inventory Guidebook

3rd Edition

September 2003 Update



**Co-operative Programme
for Monitoring and Evaluation
of the Long Range Transmission
of Air Pollutants in Europe**

**CORINAIR
The Core Inventory of Air Emissions in Europe**

European Environment Agency



UNECE/EMEP TASK FORCE ON EMISSION INVENTORIES AND PROJECTIONS

30 September 2003

Dear Colleague

It gives us great pleasure to introduce the September 2003 Update to the third edition of the joint EMEP/CORINAIR Atmospheric Emission Inventory Guidebook, which has undergone minor revisions in 2002/2003.

This Guidebook has been prepared by the expert panels of the UNECE/EMEP Task Force on Emission Inventories and Projections and is published by the European Environment Agency (EEA).

The Guidebook is intended for general reference and, in conjunction with the revised Reporting Guidelines (**Emission Reporting Guidelines – ECE/EB.AIR/80**), for use by parties to the Convention on Long Range Transboundary Air Pollution (LRTAP) for reporting to the UNECE Secretariat in Geneva.

This edition continues to be ordered according to source nomenclature – SNAP97 – developed by EEA's European Topic Centre on Air Emissions (ETC/AE) but it is consistent with both the Nomenclature for Reporting (NFR) developed in 2001/2002 by LRTAP and IPCC source nomenclature developed for reporting under the UN Framework Climate Change Convention.

In order to better maintain and update the Guidebook it is now available only in electronic via the European Environment Agency Internet web site (<http://www.eea.eu.int>). Further development and maintenance will be carried out over the coming years.

We hope that you will continue to find the Guidebook a valuable reference document and will make use of it. It is a living document and not a fixed rule book. It provides a distillation of the best currently available information. If you find anything that you consider incorrect, out-of-date or inappropriate, if you have access to anything better, or you have data or information on activities not included in this edition, we would be grateful if you could let the Task Force Secretariat/Chair know so that the Guidebook can be further updated.

Finally we would like to thank the expert panel members for their work in preparing, using and reviewing the material and the EEA for publishing the material.



Mike Woodfield
Task Force Chair (to 2003)

Kristin Rypdal
Task Force Chair (from 2003)

ATMOSPHERIC EMISSION INVENTORY GUIDEBOOK

30 September 2003

This document contains the amended (September 2003 Update) third edition of the Atmospheric Emission Inventory Guidebook prepared by the UNECE/EMEP Task Force on Emission Inventories and Projections.

The Guidebook is designed to provide a comprehensive guide to the state-of-the-art of atmospheric emissions inventory methodology for each of the emission-generating activities listed in the current versions of the Selected Nomenclature for Air Pollution (SNAP97) but includes cross references to both the NFR and IPPC coding formats.

Chapters which are NEW or which have been REVISED since the 2nd edition can be identified by the publication date AFTER 1st September 1999. Regularly updated details of subsequent changes to the guidebook are to be kept on the EEA website: <http://reports.eea.eu.int/EMEPCORINAIR3/en/>

You are invited to use/review the document and provide comments and/or additional material either to the European Environment Agency in writing or by participating in the Task Force meetings and work of the Task Force.

You may use this Guidebook as source material for emission inventory compilation. If you do so, you should cite the source as 'Joint EMEP/CORINAIR Atmospheric Emission Inventory Guidebook, Third Edition, September 2003 Update. Copenhagen: European Environment Agency, 2003'. However, you should use the Guidebook with caution and check emission factors against any more specific information available in your country.

Jessica Sully and Nikolas Hill
Task Force Secretariat & Editors of the Guidebook (to 2003)

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INDEX TO METHODOLOGY CHAPTERS ORDERED BY SNAP97 ACTIVITY

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
01	COMBUSTION IN ENERGY AND TRANSFORMATION INDUSTRIES				
0101	Public power	1A1a	1A1a	Electricity and heat production	
010101	Combustion plants > = 300 MW (boilers)	1A1a	1A1a	Electricity and heat production	B111
010102	Combustion plants > = 50 and < 300 MW (boilers)	1A1a	1A1a	Electricity and heat production	B111/2
010103	Combustion plants < 50 MW (boilers)	1A1a	1A1a	Electricity and heat production	B111/2
010104	Gas turbines	1A1a	1A1a	Electricity and heat production	B111/2
010105	Stationary engines	1A1a	1A1a	Electricity and heat production	B111/2
0102	District heating plants	1A1a	1A1a	Electricity and heat production	
010201	Combustion plants > = 300 MW (boilers)	1A1a	1A1a	Electricity and heat production	B111
010202	Combustion plants > = 50 MW and < 300 MW (boilers)	1A1a	1A1a	Electricity and heat production	B111/2
010203	Combustion plants < 50 MW (boilers)	1A1a	1A1a	Electricity and heat production	B111/2
010204	Gas turbines	1A1a	1A1a	Electricity and heat production	B111/2
010205	Stationary engines	1A1a	1A1a	Electricity and heat production	B111/2
0103	Petroleum refining plants	1A1b	1A1b	Petroleum refining	
010301	Combustion plants > = 300 MW (boilers)	1A1b	1A1b	Petroleum refining	B111
010302	Combustion plants > = 50 MW and < 300 MW (boilers)	1A1b	1A1b	Petroleum refining	B132
010303	Combustion plants < 50 MW (boilers)	1A1b	1A1b	Petroleum refining	B132
010304	Gas turbines	1A1b	1A1b	Petroleum refining	B132
010305	Stationary engines	1A1b	1A1b	Petroleum refining	B132
010306	Process furnaces	1A1b	1A1b	Petroleum refining	B136
0104	Solid fuel transformation plants	1A1c	1A1c	Manufacture of solid fuels and other energy industries	
010401	Combustion plants > = 300 MW (boilers)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B111
010402	Combustion plants > = 50 MW and < 300 MW (boilers)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B142
010403	Combustion plants < 50 MW (boilers)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B142
010404	Gas turbines	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B142
010405	Stationary engines	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B142
010406	Coke oven furnaces	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B146
010407	Other (coal gasification, liquefaction,...)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B142

¹ * Items marked with asterisk concern only greenhouse gases that are not reported to EMEP and therefore have no NFR code.

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
0105	Coal mining, oil / gas extraction, pipeline compressors				
010501	Combustion plants > = 300 MW (boilers)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B111
010502	Combustion plants > = 50 MW and < 300 MW (boilers)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B152
010503	Combustion plants < 50 MW (boilers)	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B152
010504	Gas turbines	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B152
010505	Stationary engines	1A1c	1A1c	Manufacture of solid fuels and other energy industries	B152
010506	Pipeline compressors	1A3e	1A3e i	Transport-Other transportation, Pipeline compressors	B561
02	NON-INDUSTRIAL COMBUSTION PLANTS				
0201	Commercial and institutional plants	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	
020101	Combustion plants > = 300 MW (boilers)	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	B111
020102	Combustion plants > = 50 MW and < 300 MW (boilers)	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	B111/2
020103	Combustion plants < 50 MW (boilers)	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	B111/2
020104	Stationary gas turbines	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	B111/2
020105	Stationary engines	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	B111/2
020106	Other stationary equipment	1A4a; 1A5a	1A4a; 1A5a	Other sectors- Commercial/Institutional (excluding military); Other stationary (including military)	B216
0202	Residential plants	1A4b	1A4b i	Other Sectors-Residential, Residential plants	
020201	Combustion plants > = 50 MW (boilers)	1A4b	1A4b i	Other Sectors-Residential, Residential plants	B111/2
020202	Combustion plants < 50 MW (boilers)	1A4b	1A4b i	Other Sectors-Residential, Residential plants	B111/2
020203	Gas turbines	1A4b	1A4b i	Other Sectors-Residential, Residential plants	B111/2
020204	Stationary engines	1A4b	1A4b i	Other Sectors-Residential, Residential plants	B111/2

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
020205	Other equipment (stoves, fireplaces, cooking,..)	1A4b	1A4b i	Other Sectors-Residential, Residential plants	B225
0203	Plants in agriculture, forestry and aquaculture	1A4c	1A4c i	Other Sectors-Agriculture/Forestry/Fishing, Stationary	
020301	Combustion plants > = 50 MW (boilers)	1A4c	1A4c i	Other Sectors-Agriculture/Forestry/Fishing, Stationary	B111/2
020302	Combustion plants < 50 MW (boilers)	1A4c	1A4c i	Other Sectors-Agriculture/Forestry/Fishing, Stationary	B111/2
020303	Stationary gas turbines	1A4c	1A4c i	Other Sectors-Agriculture/Forestry/Fishing, Stationary	B111/2
020304	Stationary engines	1A4c	1A4c i	Other Sectors-Agriculture/Forestry/Fishing, Stationary	B111/2
020305	Other stationary equipments	1A4c	1A4c i	Other Sectors-Agriculture/Forestry/Fishing, Stationary	B235
03	COMBUSTION IN MANUFACTURING INDUSTRY				
0301	Combustion in boilers, gas turbines and stationary engines	1A2 a-f	1A2 a-f	Industry	
030101	Combustion plants > = 300 MW (boilers)	1A2 a-f	1A2 a-f	Industry	B111
030102	Combustion plants > = 50 MW and < 300 MW (boilers)	1A2 a-f	1A2 a-f	Industry	B111/2
030103	Combustion plants < 50 MW (boilers)	1A2 a-f	1A2 a-f	Industry	B111/2
030104	Gas turbines	1A2 a-f	1A2 a-f	Industry	B111/2
030105	Stationary engines	1A2 a-f	1A2 a-f	Industry	B111/2
030106	Other stationary equipment (When relevant economic sector split data are available in CORINAIR, data can be allocated to sub-categories a to f.)	1A2 a-f	1A2 a-f	Industry	B316
0302	Processes with or without contact				
030203	Blast furnace cowpers	1A2a	1A2a	Industry-Iron and steel	B323
030204	Plaster furnaces	1A2f	1A2f	Industry-Other	B324
030205	Other furnaces	1A2f	1A2f	Industry-Other	B325
0303	Processes with contact				
030301	Sinter and pelletizing plants	1A2a	1A2a	Industry-Iron and steel	B331
030302	Reheating furnaces steel and iron	1A2a	1A2a	Industry-Iron and steel	B332
030303	Grey iron foundries	1A2a	1A2a	Industry-Iron and steel	B333
030304	Primary lead production	1A2b	1A2b	Industry-Non-ferrous metals	B334
030305	Primary zinc production	1A2b	1A2b	Industry-Non-ferrous metals	B335
030306	Primary copper production	1A2b	1A2b	Industry-Non-ferrous metals	B336
030307	Secondary lead production	1A2b	1A2b	Industry-Non-ferrous metals	B337
030308	Secondary zinc production	1A2b	1A2b	Industry-Non-ferrous metals	B338
030309	Secondary copper production	1A2b	1A2b	Industry-Non-ferrous metals	B339
030310	Secondary aluminium production	1A2b	1A2b	Industry-Non-ferrous metals	B3310
	SF6 emission for 03.03.10	2C4	*	Industrial Processes-Metal Production-SF6 Used	

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
030311	Cement	1A2f	1A2f	Industry-Other	B3311
030312	Lime	1A2f	1A2f	Industry-Other	B3312
030313	Asphalt concrete plants	1A2f	1A2f	Industry-Other	B3313
030314	Flat glass	1A2f	1A2f	Industry-Other	B3314
030315	Container glass	1A2f	1A2f	Industry-Other	B3314
030316	Glass wool (except binding)	1A2f	1A2f	Industry-Other	B3314
030317	Other glass (including special glass)	1A2f	1A2f	Industry-Other	B3314
030318	Mineral wool	1A2f	1A2f	Industry-Other	B3318
030319	Bricks and tiles	1A2f	1A2f	Industry-Other	B3319
030320	Fine ceramics materials	1A2f	1A2f	Industry-Other	B3320
030321	Paper-mill industry (drying processes)	1A2d	1A2d	Industry-Pulp, Paper and Print	B3321
030322	Alumina production	1A2b	1A2b	Industry-Non-ferrous metals	B3322
030323	Magnesium production (dolomite treatment)	1A2b	1A2b	Industry-Non-ferrous metals	B3323
030324	Nickel production (thermal process)	1A2b	1A2b	Industry-Non-ferrous metals	B3323
030325	Enamel production	1A2f	1A2f	Industry-Other	B3323
030326	Other	1A2f	1A2f	Industry-Other	B3323
04 PRODUCTION PROCESSES					
0401	Processes in petroleum industries	1B2a iv	1B2a iv	Fugitive Emissions from Fuels, Refining / storage	B410
040101	Petroleum products processing	1B2a iv	1B2a iv	Fugitive Emissions from Fuels, Refining / storage	B411
040102	Fluid catalytic cracking - CO boiler	1B2a iv	1B2a iv	Fugitive Emissions from Fuels, Refining / storage	B411
040103	Sulphur recovery plants	1B2a iv	1B2a iv	Fugitive Emissions from Fuels, Refining / storage	B413
040104	Storage & handling of products in refinery	1B2a iv	1B2a iv	Fugitive Emissions from Fuels, Refining / storage	B414
040105	Other	1B2a iv	1B2a iv	Fugitive Emissions from Fuels, Refining / storage	B415
0402	Processes in iron and steel industries and collieries				
040201	Coke oven (door leakage and extinction)	1B1b	1B1b	Fugitive emissions from fuels-Solid fuels/Transformation	B146
040202	Blast furnace charging	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B422
040203	Pig iron tapping	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B423
040204	Solid smokeless fuel	1B1b	1B1b	Fugitive emissions from fuels-Solid fuels/Transformation	B424
040205	Open hearth furnace steel plant	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B425
040206	Basic oxygen furnace steel plant	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B426
040207	Electric furnace steel plant	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B427
040208	Rolling mills	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B428
040209	Sinter and pelletizing plants (except combustion 030301)	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B331
040210	Other	2C1	2C1	Industrial Processes-Metal Production-Iron and steel	B4210

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
0403	Processes in non-ferrous metal industries				
040301	Aluminium production (electrolysis)	2C3	2C3	Industrial Processes-Metal Production-Aluminium	B431
	SF6 emission from 04.03.01 and 04.03.04	2C4	*	Industrial Processes-Metal Production-SF6 Used	
040302	Ferro alloys	2C2	2C2	Industrial Processes-Metal Production-Ferroalloys	B432
040303	Silicium production	2C5	2C5	Industrial Processes-Metal Production-Other	B432
040304	Magnesium production (except 030323)	2C5	2C5	Industrial Processes-Metal Production-Other	B432
040305	Nickel production (except 030324)	2C5	2C5	Industrial Processes-Metal Production-Other	B432
040306	Allied metal manufacturing	2C5	2C5	Industrial Processes-Metal Production-Other	B432
040307	Galvanising	2C5	2C5	Industrial Processes-Metal Production-Other	B432
040308	Electroplating	2C5	2C5	Industrial Processes-Metal Production-Other	B432
040309	Other	2C5	2C5	Industrial Processes-Metal Production-Other	B432
0404	Processes in inorganic chemical industries				
040401	Sulphuric acid	2B5	2B5	Industrial Processes-Chemical Industry/Other	B441
040402	Nitric acid	2B2	2B2	Industrial Processes-Chemical Industry-Nitric Acid	B442
040403	Ammonia	2B1	2B1	Industrial Processes-Chemical Industry-Ammonia	B443
040404	Ammonium sulphate	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040405	Ammonium nitrate	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040406	Ammonium phosphate	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040407	NPK fertilisers	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040408	Urea	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040409	Carbon black	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040410	Titanium dioxide	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040411	Graphite	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040412	Calcium carbide production	2B4	2B4	Industrial Processes-Chemical Industry-Carbide	B443
040413	Chlorine production	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040414	Phosphate fertilisers	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040415	Storage and handling of inorganic chemical products	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443
040416	Other	2B5	2B5	Industrial Processes-Chemical Industry/Other	B443

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
0405	Processes in organic chemical industries (bulk production)				
040501	Ethylene	2B5	2B5	Industrial Processes-Chemical Industry-Other	B451
040502	Propylene	2B5	2B5	Industrial Processes-Chemical Industry/Other	B452
040503	1,2 dichloroethane (except 040505)	2B5	2B5	Industrial Processes-Chemical Industry/Other	B453
040504	vinylchloride (except 040505)	2B5	2B5	Industrial Processes-Chemical Industry/Other	B454
040505	1,2 dichloroethane + vinylchloride (balanced process)	2B5	2B5	Industrial Processes-Chemical Industry/Other	B455
040506	Polyethylene low density	2B5	2B5	Industrial Processes-Chemical Industry/Other	B456
040507	Polyethelene high density	2B5	2B5	Industrial Processes-Chemical Industry/Other	B456
040508	Polyvinylchloride	2B5	2B5	Industrial Processes-Chemical Industry/Other	B458
040509	Polypropylene	2B5	2B5	Industrial Processes-Chemical Industry/Other	B459
040510	Styrene	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4510
040511	Polystyrene	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4511
040512	Styrene butadiene	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4512
040513	Styrene-butadiene latex	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4512
040514	Styrene-butadiene rubber (SBR)	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4512
040515	Acrylonitrile butadiene styrene (ABS) resins	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4515
040516	Ethylene oxyde	2B5	2B5	Industrial Processes-Chemical Industry/Other	B453
040517	Formaldehyde	2B5	2B5	Industrial Processes-Chemical Industry/Other	B453
040518	Ethylbenzene	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4518
040519	Phtalic anhydride	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4519
040520	Acrylonitrile	2B5	2B5	Industrial Processes-Chemical Industry/Other	B4520
040521	Adipic acid	2B3	2B3	Industrial Processes-Chemical Industry-Adipic Acid	B4521
040522	Storage & handling of organic chemical products	2B5	2B5	Industrial Processes-Chemical Industry-Other	B453
040523	Glyoxylic acid	2B5	2B5	Industrial Processes-Chemical Industry/Other	B453
040524	Halogenated hydrocarbons production	2B5	2B5	Industrial Processes-Chemical Industry-Other	B453
040525	Pesticide production	2B5	2B5	Industrial Processes-Chemical Industry/Other	B453
040526	Production of persistent organic compounds	2B5	2B5	Industrial Processes-Chemical Industry-Other	B453
040527	Other (phytosanitary ...)	2B5	2B5	Industrial Processes-Chemical Industry-Other	B453

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
0406	Processes in wood, paper pulp, food, drink and other industries				
040601	Chipboard	2D1	2D1	Industrial processes-Other Production-Pulp and Paper	B461
040602	Paper pulp (kraft process)	2D1	2D1	Industrial processes-Other Production-Pulp and Paper	B462
040603	Paper pulp(acid sulphite process)	2D1	2D1	Industrial processes-Other Production-Pulp and Paper	B463
040604	Paper pulp (neutral sulphite semi-chemical process.)	2D1	2D1	Industrial processes-Other Production-Pulp and Paper	B464
040605	Bread	2D2	2D2	Industrial processes-Other Production-Food and Drink	B465
040606	Wine	2D2	2D2	Industrial processes-Other Production-Food and Drink	B466
040607	Beer	2D2	2D2	Industrial processes-Other Production-Food and Drink	B466
040608	Spirits	2D2	2D2	Industrial processes-Other Production-Food and Drink	B466
040610	Asphalt roofing materials	2A5	2A5	Industrial processes-Mineral Products-Asphalt Roofing	B4610
040611	Road paving with asphalt	2A6	2A6	Industrial processes-Mineral Products-Road Paving with Asphalt	B4611
040612	Cement (decarbonizing)	2A1	2A1	Industrial processes-Mineral Products-Cement production	B3311
040613	Glass (decarbonizing)	2A7	2A7	Industrial processes-Mineral Products-Other	B3314
040614	Lime (decarbonizing)	2A2	2A2	Industrial processes-Mineral products/Lime production	B461
040615	Batteries manufacturing	2A7	2A7	Industrial processes-Mineral Products-Other	B461
040616	Extraction of mineral ores	2A7	2A7	Industrial processes-Mineral Products-Other	B461
040617	Other (including asbestos products manufacturing)	2A7	2A7	Industrial processes-Mineral Products-Other	B461
040618	Limestone and dolomite use	2A3	2A3	Industrial processes-Limestone and Dolomite use	B4618
040619	Soda ash production and use	2A4	2A4	Industrial processes-Soda Ash production and use	B4619
0408	Production of halocarbons and sulphur hexafluoride		*		B480
040801	Halogenated hydrocarbons production - 20 By-products		*	Industrial Processes.-Production of HFC and SF6-By-products	B480
040802	Halogenated hydrocarbons production - 200 Fugitive		*	Industrial Processes.-Production of HFC and SF6-Fugitive	B480
040803	Halogenated hydrocarbons production - 2000 Other		*	Industrial Processes.-Production of HFC and SF6-Other	B480
040804	Sulphur hexafluoride production - By-products	20	*	Industrial Processes.-Production of HFC and SF6-By-products	B480
040805	Sulphur hexafluoride production - Fugitive	200	*	Industrial Processes.-Production of HFC and SF6-Fugitive	B480
040806	Sulphur hexafluoride production - Other	2000	*	Industrial Processes.-Production of HFC and SF6-Other	B480

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05	EXTRACTION AND DISTRIBUTION OF FOSSIL FUELS AND GEOTHERMAL ENERGY				
0501	Extraction and 1st treatment of solid fossil fuels	1B1a	1B1a	Coal mining and handling	
050101	Open cast mining	1B1a	1B1a	Coal mining and handling	B511
050102	Underground mining	1B1a	1B1a	Coal mining and handling	B511
050103	Storage of solid fuel	1B1a	1B1a	Coal mining and handling	B511
0502	Extraction, 1st treatment and loading of liquid fossil fuels	1B2a	1B2a i	Fugitive Emissions from Fuels, Oil - Exploration, Production, Transport	
050201	Land-based activities	1B2a	1B2a i	Fugitive Emissions from Fuels, Oil - Exploration, Production, Transport	B521
050202	Off-shore activities	1B2a	1B2a i	Fugitive Emissions from Fuels, Oil - Exploration, Production, Transport	B521
0503	Extraction, 1st treat. and loading of gaseous fossil fuels	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	
050301	Land-based desulfuration	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	B521
050302	Land-based activities (other than desulfuration)	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	B521
050303	Off-shore activities	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	B521
0504	Liquid fuel distribution (except petrol distribution)	1B2a	1B2a i	Fugitive Emissions from Fuels, Oil - Exploration, Production, Transport	
050401	Marine terminals (tankers, handling and storage)	1B2a	1B2a i	Fugitive Emissions from Fuels, Oil - Exploration, Production, Transport	B541
050402	Other handling and storage (including pipeline)	1B2a	1B2a i	Fugitive Emissions from Fuels, Oil - Exploration, Production, Transport	B541
0505	Petrol distribution	1B2a v	1B2a v	Fugitive Emissions from Fuels, Distribution of oil products	
050501	Refinery dispatch station	1B2a v	1B2a v	Fugitive Emissions from Fuels, Distribution of oil products	B551
050502	Transport and depots (except 050503)	1B2a v	1B2a v	Fugitive Emissions from Fuels, Distribution of oil products	B551
050503	Service stations (including refuelling of cars)	1B2a v	1B2a v	Fugitive Emissions from Fuels, Distribution of oil products	B551
0506	Gas distribution networks	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	
050601	Pipelines	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	B561
050603	Distribution networks	1B2b	1B2b	Fugitive Emissions from Fuels, Natural gas	B561
0507	Geothermal energy extraction	7	7	Other	B570

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06	SOLVENT AND OTHER PRODUCT USE				
060000	Solvent and other product use (introduction)				B600
06000a	Solvent and other product use (note)				B600a
0601	Paint application	3A	3A	Solvent and other product use- Paint application	B610
060101	Manufacture of automobiles	3A	3A	Solvent and other product use- Paint application	B610
060102	Car repairing	3A	3A	Solvent and other product use- Paint application	B610
060103	Construction and buildings (except 060107)	3A	3A	Solvent and other product use- Paint application	B610
060104	Domestic use (except 060107)	3A	3A	Solvent and other product use- Paint application	B610
060105	Coil coating	3A	3A	Solvent and other product use- Paint application	B610
060106	Boat building	3A	3A	Solvent and other product use- Paint application	B610
060107	Wood	3A	3A	Solvent and other product use- Paint application	B610
060108	Other industrial paint application	3A	3A	Solvent and other product use- Paint application	B610
060109	Other non industrial paint application	3A	3A	Solvent and other product use- Paint application	B610
0602	Degreasing, dry cleaning and electronics	3B	3B	Solvent and other product use- Degreasing and dry cleaning	
060201	Metal degreasing	3B	3B	Solvent and other product use- Degreasing and dry cleaning	B621
060202	Dry cleaning	3B	3B	Solvent and other product use- Degreasing and dry cleaning	B622
060203	Electronic components manufacturing	3B	3B	Solvent and other product use- Degreasing and dry cleaning	B623
060204	Other industrial cleaning	3B	3B	Solvent and other product use- Degreasing and dry cleaning	B623
	PFC and HFC emissions	2F5	*	Industrial processes- Consumption of halocarbons and SF6-Solvents	
	SF6 emissions	2F6	*	Industrial processes- Consumption of halocarbons and SF6-Other	
0603	Chemical products manufacturing or processing	3C	3C	Solvent and other product use- Chemical products	
060301	Polyester processing	3C	3C	Solvent and other product use- Chemical products	B631
060302	Polyvinylchloride processing	3C	3C	Solvent and other product use- Chemical products	B631
060303	Polyurethane foam processing	3C	3C	Solvent and other product use- Chemical products	B633
060304	Polystyrene foam processing	3C	3C	Solvent and other product use- Chemical products	B633
060305	Rubber processing	3C	3C	Solvent and other product use- Chemical products	B631

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060306	Pharmaceutical products manufacturing	3C	3C	Solvent and other product use- Chemical products	B631
060307	Paints manufacturing	3C	3C	Solvent and other product use- Chemical products	B631
060308	Inks manufacturing	3C	3C	Solvent and other product use- Chemical products	B631
030609	Glues manufacturing	3C	3C	Solvent and other product use- Chemical products	B631
060310	Asphalt blowing	3C	3C	Solvent and other product use- Chemical products	B6310
060311	Adhesive, magnetic tapes, films & photographs manufacturing	3C	3C	Solvent and other product use- Chemical products	B631
060312	Textile finishing	3C	3C	Solvent and other product use- Chemical products	B631
060313	Leather tanning	3C	3C	Solvent and other product use- Chemical products	B631
060314	Other	3C	3C	Solvent and other product use- Chemical products	B631
	PFC and HFC emissions	2F5	*	Industrial processes- Consumption of halocarbons and SF6-Solvents	
0604	Other use of solvents and related activities	3D	3D	Solvent and other product use- Other	
060401	Glass wool enduction	3D	3D	Solvent and other product use- Other	B641
060402	Mineral wool enduction	3D	3D	Solvent and other product use- Other	B641
060403	Printing industry	3D	3D	Solvent and other product use- Other	B643
060404	Fat, edible and not edible oil extraction	3D	3D	Solvent and other product use- Other	B644
060405	Application of glues and adhesives	3D	3D	Solvent and other product use- Other	B641
060406	Preservation of wood	3D	3D	Solvent and other product use- Other	B646
060407	Underseal treatment and conservation of vehicles	3D	3D	Solvent and other product use- Other	B647
060408	Domestic solvent use (other than paint application)	3D	3D	Solvent and other product use- Other	B648
060409	Vehicles dewaxing	3D	3D	Solvent and other product use- Other	B647
060411	Domestic use of pharmaceutical products	3D	3D	Solvent and other product use- Other	B641
060412	Other (preservation of seeds,....)	3D	3D	Solvent and other product use- Other	B641
	SF6, PFC and HFC emissions for 06.04.01 and 06.04.02	2F6	*	Industrial processes- Consumption of halocarbons and SF6-Other	
0605	Use of HFC, N2O, NH3, PFC & SF6		*		
060501	Anaesthesia	3D	*	Solvent and other product use- Other	B651
060502	Refrigeration and air conditioning equipment	2G	*	Industrial processes-Other	B651

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060503	Refrigeration and air conditioning equipment using other products than halocarbons	2G	2G	Industrial processes-Other	B651
060504	Foam Blowing (except 060304)	2F2	*	Industrial processes-Foam Blowing	B651
060505	Fire extinguishers	2F3	*	Industrial processes-Fire extinguishers	B651
060506	Aerosol cans	2G	2G	Industrial processes-Other	B651
060507	Electrical equipment	2F6	*	Industrial processes-Consumption of halocarbons and SF6-Other	B651
060508	Other	2F6	*	Industrial processes-Consumption of halocarbons and SF6-Other	B651
060508	Other	3D	3D	Solvent and other product use-Other (except halocarbons and sulphur hexafluoride)	B651
07 ROAD TRANSPORT					
0701	Passenger cars	1A3b	1A3b i	Road Transportation, Passenger Cars	B710
070101	Highway driving	1A3b	1A3b i	Road Transportation, Passenger Cars	B710
070102	Rural driving	1A3b	1A3b i	Road Transportation, Passenger Cars	B710
070103	Urban driving	1A3b	1A3b i	Road Transportation, Passenger Cars	B710
0702	Light-duty vehicles < 3.5 t	1A3b	1A3b ii	Road Transportation, Light duty vehicles	B710
070201	Highway driving	1A3b	1A3b ii	Road Transportation, Light duty vehicles	B710
070202	Rural driving	1A3b	1A3b ii	Road Transportation, Light duty vehicles	B710
070203	Urban driving	1A3b	1A3b ii	Road Transportation, Light duty vehicles	B710
0703	Heavy-duty vehicles > 3.5 t and buses	1A3b	1A3b iii	Road Transportation, Heavy duty vehicles	B710
070301	Highway driving	1A3b	1A3b iii	Road Transportation, Heavy duty vehicles	B710
070302	Rural driving	1A3b	1A3b iii	Road Transportation, Heavy duty vehicles	B710
070303	Urban driving	1A3b	1A3b iii	Road Transportation, Heavy duty vehicles	B710
0704	Mopeds and Motorcycles < 50 cm³	1A3b	1A3b iv	Road Transportation, Mopeds and motorcycles	B710
0705	Motorcycles > 50 cm³	1A3b	1A3b iv	Road Transportation, Mopeds and motorcycles	B710
070501	Highway driving	1A3b	1A3b iv	Road Transportation, Mopeds and motorcycles	B710
070502	Rural driving	1A3b	1A3b iv	Road Transportation, Mopeds and motorcycles	B710

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070503	Urban driving	1A3b	1A3b iv	Road Transportation, Mopeds and motorcycles	B710
0706	Gasoline evaporation from vehicles	-	1A3b v	Gasoline Evaporation from vehicles	B760
0707	Automobile tyre and brake wear	-	1A3b vi	Automobile tyre and brake wear	B770
0708	Automobile road abraision	-	1A3b vii	Automobile road abraision	B770
08	OTHER MOBILE SOURCES AND MACHINERY				
0801	Military	1A5b	1A5b	Other, Mobile (including military)	B810
0802	Railways	1A3c	1A3c	Transport-Railways	B810
080201	Shunting locs	1A3c	1A3c	Transport-Railways	B810
080202	Rail-cars	1A3c	1A3c	Transport-Railways	B810
080203	Locomotives	1A3c	1A3c	Transport-Railways	B810
0803	Inland waterways	1A3d	1A3d ii	Transport-Navigation, National navigation	B810
080301	Sailing boats with auxiliary engines	1A3d	1A3d ii	Transport-Navigation, National navigation	B810
080302	Motorboats / workboats	1A3d	1A3d ii	Transport-Navigation, National navigation	B810
080303	Personal watercraft	1A3d	1A3d ii	Transport-Navigation, National navigation	B810
080304	Inland goods carrying vessels	1A3d	1A3d ii	Transport-Navigation, National navigation	B810
0804	Maritime activities				
080402	National sea traffic	1A3d	1A3d ii	Transport-Navigation, National navigation	B842
080403	National fishing	1A4c	1A4c iii	Small combustion-Agriculture/Forestry/Fishing	B842
080404	International sea traffic (international bunkers)	1A3d	1A3d i	Transport-Navigation, International marine (bunkers)	B842
0805	Air traffic				
080501	Domestic airport traffic (LTO cycles - <1000 m)	1A3a ii	1A3a ii (i)	Transport-Civil aviation, Domestic, LTO	B851
080502	International airport traffic (LTO cycles - <1000 m)	1A3a i	1A3a i (i)	Transport-Civil aviation, International, LTO	B851
080503	National cruise traffic (>1000 m)	1A3a ii	1A3a ii (ii)	Transport-Civil aviation, Domestic, Cruise	B851
080504	International cruise traffic (>1000 m)	1A3a i	1A3a i (ii)	Transport-Civil aviation, International, Cruise	B851
0806	Agriculture	1A4c	1A4c ii	Small combustion-Agriculture/Forestry/Fishing - Off road vehicles and other machinery	B810

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0807	Forestry	1A4c	1A4c ii	Small combustion-Agriculture/Forestry/Fishing - Off road vehicles and other machinery	B810
0808	Industry	1A2 a-f	1A2 a-f	Industry	B810
0809	Household and gardening	1A4b	1A4b ii	Small combustion-Residential, Household and gardening (mobile)	B810
0810	Other off-road	1A3e	1A3e ii	Transport-Other, Other mobile sources and machinery	B810
09 WASTE TREATMENT AND DISPOSAL					
0902 Waste incineration					
090201	Incineration of domestic or municipal wastes	6C	6C	Waste-Incineration	B921
090202	Incineration of industrial wastes (except flaring)	6C	6C	Waste-Incineration	B922
090203	Flaring in oil refinery	1B2c	1B2c	Fugitive emissions from fuels-Oil and natural gas/Venting and flaring	B923
090204	Flaring in chemical industries	6C	6C	Waste-Incineration	B924
090205	Incineration of sludges from waste water treatment	6C	6C	Waste-Incineration	B925
090206	Flaring in gas and oil extraction	1B2c	1B2c	Fugitive emissions from fuels-Oil and natural gas/Venting and flaring	B926
090207	Incineration of hospital wastes	6C	6C	Waste-Incineration	B927
090208	Incineration of waste oil	6C	6C	Waste-Incineration	B924
0904	Solid waste disposal on land (SNAP94 code 091004)				B940
090401	Managed waste disposal on land	6A1	6A1	Waste-Solid waste disposal on land-Managed Disposal	B940
090402	Unmanaged waste disposal on land	6A2	6A2	Waste-Solid waste disposal on land-Unmanaged Sites	B940
090403	Other	6A3	6A3	Waste-Solid waste disposal on land-Other	B940
0907	Open burning of agricultural wastes (except 10.03)	6C	6C	Waste-Incineration	B970
0909 Cremation					
090901	Incineration of corpses	6C	6C	Waste-Incineration	B991
090902	Incineration of carcasses	6C	6C	Waste-Incineration	B992
0910 Other waste treatment					
091001	Waste water treatment in industry	6B1	6B1	Waste-Wastewater treatment/Industrial	B9101
091002	Waste water treatment in residential and commercial sect.	6B2	6B2	Waste-Wastewater treatment/Domestic and commercial	B9101
091003	Sludge spreading	6D	6D	Waste-Other	B9103

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[091004	Land filling (moved to SNAP97 code 090400)]				
091005	Compost production	6D	6D	Waste-Other	B9105
091006	Biogas production	6D	6D	Waste-Other	B9106
091007	Latrines	6B2	6B2	Waste-Wastewater treatment/Domestic and commercial	B9107
091008	Other production of fuel (refuse derived fuel,...)	6D	6D	Waste-Other	B9106
10	AGRICULTURE				B1000
1001	Cultures with fertilisers (fertilised agricultural land)				B1010
100101	Permanent crops	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1010
100102	Arable land crops	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1010
100103	Rice field	4C	4C	Agriculture-Rice cultivation	B1010
100104	Market gardening	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1010
100105	Grassland	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1010
100106	Fallows	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1010
1002	Cultures without fertilisers				B1020
100201	Permanent crops	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1020
100202	Arable land crops	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1020
100203	Rice field	4C	4C	Agriculture-Rice cultivation	B1020
100204	Market gardening	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1020
100205	Grassland	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1020
100206	Fallows	4D1	4D1	Agriculture-Agricultural soils - Direct soil emission	B1020
1003	On-field burning of stubble, straw,...			Agriculture-Field burning of agricultural wastes	B1030
100301	Cereals	4F1	4F1	Agriculture-Field burning of agricultural wastes-Cereals	B1030
100302	Pulse	4F2	4F2	Agriculture-Field burning of agricultural wastes-Pulse	B1030
100303	Tuber and Root	4F3	4F3	Agriculture-Field burning of agricultural wastes-Tuber and Root	B1030
100304	Sugar Cane	4F4	4F4	Agriculture-Field burning of agricultural wastes-Sugar Cane	B1030
100305	Other	4F5	4F5	Agriculture-Field burning of agricultural wastes-Other	B1030
1004	Enteric fermentation	4A	*	Agriculture-Enteric fermentation	B1040
100401	Dairy cows	4A1a	*	Agriculture-Enteric fermentation/Cattle/Dairy	B1040

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100402	Other cattle	4A1b	*	Agriculture-Enteric fermentation/Cattle/Non-dairy	B1040
100403	Sheep	4A3	*	Agriculture-Enteric fermentation/Sheep	B1040
100404	Fattening pigs	4A8	*	Agriculture-Enteric fermentation/Swine	B1040
100405	Horses	4A6	*	Agriculture-Enteric fermentation/Horses	B1040
100406	Mules and asses	4A7	*	Agriculture-Enteric fermentation/Mules and asses	B1040
100407	Goats	4A4	*	Agriculture-Enteric fermentation/Goats	B1040
100408	Laying hens	4A9	*	Agriculture-Enteric fermentation/Poultry	B100408
100409	Broilers	4A9	*	Agriculture-Enteric fermentation/Poultry	B100408
100410	Other poultry (ducks, geese, etc.)	4A9	*	Agriculture-Enteric fermentation/Poultry	B100408
100411	Fur animals	4A10	*	Agriculture-Enteric fermentation/Other	B100408
100412	Sows	4A8	*	Agriculture-Enteric fermentation/Swine	B100408
100413	Camels	4A5	*	Agriculture-Enteric fermentation/Camels and llamas	B100408
100414	Buffalo	4A2	*	Agriculture-Enteric fermentation/Buffalo	B100408
100415	Other	4A10	*	Agriculture-Enteric fermentation/Other	B100408
1005	Manure management regarding Organic compounds				B1050
100501	Dairy cows	4B1a	4B1a	Agriculture-Manure management/Cattle/Dairy	B1050
100502	Other cattle	4B1b	4B1b	Agriculture-Manure management/Cattle/Non-dairy	B1050
100503	Fattening pigs	4B8	4B8	Agriculture-Manure management/Swine	B1050
100504	Sows	4B8	4B8	Agriculture-Manure management/Swine	B1050
100505	Sheep	4B3	4B3	Agriculture-Manure management/Sheep	B1050
100506	Horses	4B6	4B6	Agriculture-Manure management/Horses	B1050
100507	Laying hens	4B9	4B9	Agriculture-Manure management/Poultry	B1050
100508	Broilers	4B9	4B9	Agriculture-Manure management/Poultry	B1050
100509	Other poultry (ducks, geese, etc.)	4B10	4B10	Agriculture-Manure management/Poultry	B1050
100510	Fur animals	4B13	4B13	Agriculture-Manure management/Other	B1050
100511	Goats	4B4	4B4	Agriculture-Manure management/Goats	B100511
100512	Mules and asses	4B7	4B7	Agriculture-Manure management/Mules and asses	B100511
100513	Camels	4B5	4B5	Agriculture-Manure management/Camels and llamas	B100511

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100514	Buffalo	4B2	4B2	Agriculture-Manure management/Buffalo	B100511
100515	Other	4B13	4B13	Agriculture-Manure management/Other	B100511
1006	Use of pesticides and Limestone Items 10.06.01 to 10.06.04 (CO2 from liming only)	4G 5D	4G *	Other CO2 Emissions and removals from soil	B1060
[100700	Managed deciduous forests (moved to SNAP97 code 111100)]				
[100800	Managed coniferous forests (moved to SNAP97 code 111200)]				
1009	Manure management regarding Nitrogen compounds				B1090
100901	Dairy cows	4B1a	4B1a	Agriculture-Manure management/Cattle/Dairy	B1090
100902	Other cattle	4B1b	4B1b	Agriculture-Manure management/Cattle/Non-dairy	B1090
100903	Fattening pigs	4B8	4B8	Agriculture-Manure management/Swine	B1090
100904	Sows	4B8	4B8	Agriculture-Manure management/Swine	B1090
100905	Sheep	4B3	4B3	Agriculture-Manure management/Sheep	B1090
100906	Horses	4B6	4B6	Agriculture-Manure management/Horses	B1090
100907	Laying hens	4B9	4B9	Agriculture-Manure management/Poultry	B1090
100908	Broilers	4B9	4B9	Agriculture-Manure management/Poultry	B1090
100909	Other poultry (ducks, geese, etc.)	4B10	4B10	Agriculture-Manure management/Poultry	B1090
100910	Fur animals	4B13	4B13	Agriculture-Manure management/Other	B1090
100911	Goats	4B4	4B4	Agriculture-Manure management/Goats	B1090
100912	Mules and asses	4B7	4B7	Agriculture-Manure management/Mules and asses	B1090
100913	Camels	4B5	4B5	Agriculture-Manure management/Camels and llamas	B1090
100914	Buffalo	4B2	4B2	Agriculture-Manure management/Buffalo	B1090
100915	Other	4B13	4B13	Agriculture-Manure management/Other	B1090
11	OTHER SOURCES AND SINKS				
1101	Non-managed broadleaf forests	-	*	Not allocated	B1101
110117	Non-managed deciduous forests soils (excluding CO2)		*		B110117
1102	Non-managed coniferous forests	-	*	Not allocated	B1101
110216	Soils (excluding CO2)				B110117

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1103	Forest and other vegetation fires	-	*	Not allocated	
110301	Man-induced				B1103
110302	Other				B1103
1104	Natural grassland and other vegetation	-	*	Not allocated	
110401	Grassland		*	Not allocated	B1104
110402	Tundra		*	Not allocated	B1104
110403	Other low vegetation		*	Not allocated	B1104
110404	Other vegetation (Mediterranean scrub,...)		*	Not allocated	B1104
110405	Soils (excluding CO2)		*	Not allocated	B110117
1105	Wetlands (marshes - swamps)	4D	*	N2O from Leakage of N into Waters	
110501	Undrained marshes	4D	*	N2O from Leakage of N into Waters	B1105
110502	Drained marshes	4D	*	N2O from Leakage of N into Waters	B1105
110503	Bogs	4D	*	N2O from Leakage of N into Waters	B1105
110504	Fens	4D	*	N2O from Leakage of N into Waters	B1105
110505	Swamps	4D	*	N2O from Leakage of N into Waters	B1105
110506	Floodplains	4D	*	N2O from Leakage of N into Waters	B1105
1106	Waters	4D	*	N2O from Leakage of N into Waters	B1106
1107	Animals	-	*	Not allocated	B1107
110701	Termites	-	*	Not allocated	B1107
110702	Mammals	-	*	Not allocated	B1107
110703	Other animals	-	*	Not allocated	B1107
1108	Volcanoes	-	*	Not allocated	B1108
1109	Gas seeps	-	*	Not allocated	B1109
1110	Lightning	-	*	Not allocated	B1110
1111	Managed broadleaf forests	5E	5E	Land Use Change and Forestry- Other	B1101
	Items 11.11.04 to 11.11.11 and 11.11.15 to 11.11.17	5E	5E	Land Use Change and Forestry- Other	B1101
111117	Managed deciduous forests soils (excluding CO2)	5E	5E	Land Use Change and Forestry- Other	B110117
1112	Managed coniferous forests	5E	5E	Land Use Change and Forestry- Other	B1101
	Items 11.12.04 to 11.12.12 and 11.12.15 to 11.12.16	5E	5E	Land Use Change and Forestry- Other	B1101
111216	Managed coniferous forests soils (excluding CO2)	5E	5E	Land Use Change and Forestry- Other	B110117

SNAP	Name of SNAP/CORINAIR Activity	UNFCCC CRF	2002 NFR ¹	Reporting Detail	Chapter
1121	Changes in forest and other woody biomass stock	5A	*		B112100
112101	Tropical forests	5A1	*	Changes in forest and other woody biomass stocks/Tropical	B112100
112102	Temperate forests	5A2	*	Changes in forest and other woody biomass stocks/Temperate	B112100
112103	Boreal forests	5A3	*	Changes in forest and other woody biomass stocks/Boreal	B112100
112104	Grassland/tundra	5A4	*	Changes in forest and other woody biomass stocks/Grassland	B112100
112105	Other	5A5	*	Changes in forest and other woody biomass stocks/Other	B112100
1122	Forest and grassland conversion	5B	5B		B112200
112201	Tropical forests	5B1	5B	Forest and grassland conversion/Tropical	B112200
112202	Temperate forests	5B2	5B	Forest and grassland conversion/Temperate	B112200
112203	Boreal forests	5B3	5B	Forest and grassland conversion/Boreal	B112200
112204	Grassland	5B4	5B	Forest and grassland conversion/Grassland	B112200
112205	Other	5B5	5B	Forest and grassland conversion/Other	B112200
1123	Abandonment of Managed Land	5C	*		B112300
112301	Tropical forests	5C1	*	Abandonment of managed lands/Tropical	B112300
112302	Temperate forests	5C2	*	Abandonment of managed lands/Temperate	B112300
112303	Boreal forests	5C3	*	Abandonment of managed lands/Boreal	B112300
112304	Grassland	5C4	*	Abandonment of managed lands/Grassland	B112300
112305	Other	5C5	*	Abandonment of managed lands/Other	B112300
1124	CO2 Emissions and removals from soil (except 10.06)	5D	*	CO2 Emissions and removals from soil	B112400
1125	Other	5E	5E	Other	B112500

* Items marked with asterisk concern only greenhouse gases that are not reported to EMEP and therefore have no NFR code.

PART C**ANNEXES****CHAPTER**

Expert Panels

CEP

INTRODUCTION

1 EMISSIONS AND EMISSION INVENTORIES

Substances emitted into the atmosphere by human and natural activities are the cause of many current and potential environmental problems, including:

- acidification
- air quality degradation
- global warming/climate change
- damage and soiling of buildings and other structures
- stratospheric ozone depletion
- human and ecosystem exposure to hazardous substances.

It is necessary to have quantitative information on these emissions and their sources in order to help:

- inform the policy makers and the public
- define environmental priorities and identify the activities and actors responsible for the problems
- set explicit objectives and constraints
- assess the potential environmental impacts and implications of different strategies and plans
- evaluate the environmental costs and benefits of different policies
- monitor the state of the environment to check that targets are being achieved
- monitor policy action to ensure that it is having the desired effects
- ensure that those responsible for implementing the policies are complying with their obligations.

There are many types of sources of atmospheric emissions and many examples (often millions) of each type, for example:

- power plants
- refineries
- incinerators
- factories
- domestic households
- cars and other vehicles
- animals and humans
- fossil fuel extraction and production sites
- offices and public buildings
- trees and other vegetation

- distribution pipelines
- fertilised land
- land with biological decay.

It is not possible to measure emissions from all of the individual examples of these sources or, in the short term, from all the different source types. In practice, atmospheric emissions are estimated on the basis of measurements made at selected or representative samples of the (main) sources and source types.

The basic model for an emission estimate is the product of (at least) two variables, for example:

- an activity statistic and a typical average emission factor for the activity, or
- an emission measurement over a period of time and the number of such periods emissions occurred in the required estimation period.

For example, to estimate annual emissions of sulphur dioxide in grams per year from an oil-fired power plant you might use, either:

- annual fuel consumption (in tonnes fuel/year) and an emission factor (in grams SO₂ emitted/tonne fuel consumed), or
- measured SO₂ emissions (in grams per hour) and number of operating hours per year.

In practice, the calculations tend to more complicated but the principles remain the same.

Emission estimates are collected together into inventories or databases which usually also contain supporting data on, for example: the locations of the sources of emissions; emission measurements where available; emission factors; capacity, production or activity rates in the various source sectors; operating conditions; methods of measurement or estimation, etc.

Emission inventories may contain data on three types of source, namely point, area and line. However, in some inventories all of the data may be on area basis - region, country, sub-region etc.

Point sources - emission estimates are provided on an individual plant or emission outlet (usually large) usually in conjunction with data on location, capacity or throughput, operating conditions etc. The tendency is for more sources to be provided as point sources as legislative requirements extend to more source types and pollutants as well as more openness provides more such relevant data.

Area sources - smaller or more diffuse sources of pollution are provided on an area basis either for administrative areas, such as counties, regions etc, or for regular grids (for example the EMEP 50x50 km grid).

Line sources - in some inventories, vehicle emissions from road transport, railways, inland navigation, shipping or aviation etc are provided for sections along the line of the road, railway-track, sea-lane etc.

2 INTERNATIONAL REQUIREMENTS FOR EMISSION INVENTORIES

2.1 Long Range Transboundary Air Pollution Convention

The Convention on Long Range Transboundary Air Pollution (LRTAP) was adopted in Geneva in 1979. Reporting of emission data to the Executive Body of the Convention is required in order to fulfil obligations regarding strategies and policies in compliance with the implementation of Protocols under the Convention. These Protocols are:

- the Helsinki Sulphur Protocol (1985)
- the Sofia NO_x Protocol (1988)
- the Geneva VOC Protocol (1991)
- the Oslo Sulphur Protocol (1994)
- the Aarhus Protocols on Heavy Metal and on Persistent Organic Pollutants (POPs).

Parties should use the draft reporting procedures (EB.AIR/GE.1/1997/5) and are required to submit annual national emissions of SO₂, NO_x, NMVOC, CH₄, CO and NH₃ and various heavy metals and POPs using the 11 main source categories (level 1 of SNAP, Selected Nomenclature for sources of Air Pollution) by the 31 December following each year. For example, Parties were requested to submit data for 1997 to the Executive Body (UNECE/CLRTAP Secretariat) by 31 December 1998. Parties are invited to also report emissions of more detailed sub-sectors (SNAP level 2).

Parties are also required to provide EMEP periodically with emission data within grid elements of 50km x 50km, as defined by EMEP and known as the EMEP grid.

Parties should use the EMEP/CORINAIR Atmospheric Emission Inventory Guidebook both as a reference book on good emission estimation practice and as a check-list to ensure that all relevant activities are considered and their emissions quantified. Parties should indicate where the Guidebook methodology has been used and where not. If another methodology has been used Parties are requested to provide additional explanatory information.

2.2 United Nations Framework Convention on Climate Change (UNFCCC)

"The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve stabilisation of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner." (Article 2).

All Parties to the Convention shall " develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties;" (Article 4, paragraph 1(a)).

Parties are required to report emissions and sink estimates by 15 April for the last year but one of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆). For example data for 1997 should be reported by 15 April 1999 to the UNFCCC Secretariat. Parties should also provide information on emissions of carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs) and are encouraged to provide information of emissions of sulphur oxides (SO₂).

UNFCCC requires Parties to use the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories ("IPCC Guidelines"). Parties may use different methods ("tiers"), giving priority to those methods which are believed to produce the most accurate estimates, and Parties can also use national methodologies which they consider better able to reflect their national situation provided that these methodologies are compatible with the IPCC Guidelines and are well documented (FCCC/SBSTA/1999/L.5).

Within the framework of UNFCCC continuing efforts are aimed at improving transparency, consistency, comparability, accuracy and completeness of inventories, resulting in proposals for a new detailed "common reporting format" (CRF) and for preparing and providing access to, an annual updated, detailed and complete national inventory report for all years. These proposals are expected to be adopted at COP5 in Bonn (25 October - 5 November 1999). This would mean Parties would be requested to start with the new Common Reporting Format (CRF) on a trial basis in the years 2000 and 2001.

Within the IPCC-OECD-IEA Programme on Inventories, and continued in 1999/2000 by the IPCC Task Force on Inventories, guidance has been developed on Good Practices as well as on Managing Uncertainties. The guidance document "*Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*" was finalised, accepted and published in 2000. Guidance includes advice on choice of methodology, emission factor, activity data, and uncertainties, and on a series of quality assessment and quality control procedures, which may be applied during the preparation of inventories. It is available from the IPCC National Greenhouse Gas Inventories Programme, Technical Support Unit. C/O

Institute for Global Environmental Strategies, 1560-39 Kamiyamaguchi, Hayama, Kanagawa, Japan 240-0198; E-mail tsu@iges.or.jp. Alternatively it may be downloaded from their website at:

<http://www.ipcc-nggip.iges.or.jp>

2.3 Amended Council Decision 99/296/EC on a Monitoring Mechanism of Community CO₂ and other Greenhouse Gas Emissions

The European Community has adopted Council Decision 93/389/EEC to help monitor progress towards stabilisation of the total CO₂ emissions by 2000 at the 1990 level in the Community as a whole.

In 1999 this Decision has been amended by Council Decision 99/296/EC (26 April 1999) Amending Decision 93/389/EEC for a monitoring mechanism on CO₂ and other greenhouse gas emissions. The original Decision of 1993 has been amended to allow for the updating of the monitoring process, in particular regarding:

- the post 2000 monitoring of greenhouse gas (GHG) emission limitations and reductions,
- the application to all six Kyoto Protocol greenhouse gases (carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆),
- the requirements of the Kyoto Protocol to the UNFCCC for the EU and its Member States. The EU committed to a reduction of the emissions of the six Kyoto Protocol gases by 8% in 2008-2012 from 1990 levels.

According to Article 3.2 “Member States shall each year, not later than 31 December, report to the Commission their anthropogenic CO₂ emissions and removal by sinks for the previous calendar year. Member States shall also report national inventory data on emissions/removal of the six Kyoto GHG on an annual basis. They shall report to the Commission by 31 December year Y their final data for year Y-2, and provisional data for year Y-1. (*Art 3.2*). For example data for 1997 should be reported by 15 April 1999 to the Commission. According to Article 3.3 “The Commission shall establish inventories of emission/removal in the Community and circulate them by 1 March”.

Member States shall also report by 31 December on the most recent projected emissions for the period 2008-2012, and as far as possible, for 2005 (*Art 3.2*).

Inventories are established in accordance with the methodologies accepted by IPCC and agreed upon by the Conference of Parties (*art 3.1*).

The Commission shall take further steps to promote the comparability and transparency of national inventories and reporting (*Art.3.2*).

3 ATMOSPHERIC EMISSION INVENTORY METHODOLOGY

There have been several major international initiatives over the past 10 years that have built on each other and helped develop the emission inventory methodology to its current state. These include:

- the OECD Control of Major Air Pollutants (MAP) Project
- the DGXI Inventory
- the CORINE Programme and subsequent work by the European Environment Agency Task Force
- the Co-operative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollutants in Europe (EMEP)
- the IPCC/OECD Greenhouse Gas Emissions Programme.

3.1 OECD/MAP Project

The MAP Project was designed (OECD, 1990) to:

- assess pollution by large scale photochemical oxidant episodes in Western Europe and
- evaluate the impact of various emission control strategies for such episodes.

The Project started in 1983 and the report on the work was published in 1990.

The MAP emission inventory covered the following pollutants:

- sulphur dioxide - SO₂
- nitrogen oxides - NO_x, and
- volatile organic compounds - VOC, including natural emissions.

The inventory quantified point and area source emissions in nine main source sectors from 17 European OECD countries - the current 15 Member States (excluding the former German Democratic Republic) plus Norway and Switzerland.

The nine main source sectors were:

- mobile
- power plant
- non-industrial combustion
- industry
- organic solvent evaporation
- waste treatment and disposal
- agriculture and food industry
- nature
- miscellaneous

In most but not all cases the inventory was compiled from emission estimates submitted officially by each country. OECD worked closely with each country and with the CEC (which funded activity on the inventory to regroup emission estimates into the OECD source sectors and to help countries complete their inventories).

3.2 The DGXI Inventory

In 1985, the CEC Environment Directorate (DGXI) funded the compilation of an emission inventory for the EU12 Member States (Spain and Portugal joined the European Community during the course of the work) in 1980 and 1983.

The aim of the DGXI Inventory was (CITEPA, 1988) to collect data on emissions from all relevant sources in order to produce a database for use in the study of air pollution problems and to base policy measures in the field of air pollution control.

The inventory covered four pollutants - SO₂, NO_x, VOC and particulates - and recognised 10 main source sectors:

- utility power plant
- industrial combustion plant
- district heating
- oil refineries and petrochemical plant
- domestic heating
- industrial processes
- solvent use
- transportation
- agriculture
- nature.

The work, which was completed with the publication of the report in 1988, was carried out under contract by a group of four national laboratories/consultancies in collaboration with the Member States and OECD, who were simultaneously compiling the MAP Inventory.

3.3 CORINE and the EEA Task Force

Council Decision 85/338/EEC (OJ, 1985) established a work programme concerning an "experimental project for gathering, co-ordinating and ensuring the consistency of information on the state of the environment and natural resources in the Community". The work programme was given the name CORINE - CO-oRdination d'INformation Environnementale and include a project to gather and organise information on emissions into the air relevant to acid deposition - CORINAIR. This project started in 1986 with the objective of compiling a co-ordinated inventory of atmospheric emissions from the 12 Member States of the Community in 1985 (CORINAIR 1985).

The CORINAIR 1985 Inventory covered three pollutants - SO₂, NO_x, and VOC (total volatile organic compounds) - and recognised eight main source sectors:

- combustion (including power plant but excluding other industry)
- oil refineries
- industrial combustion
- processes
- solvent evaporation
- road transportation
- nature and
- miscellaneous.

The project also developed :

- a source sector nomenclature - NAPSEA, Nomenclature for Air Pollution Socio-Economic Activity and SNAP, Selected Nomenclature for Air Pollution - for emission source sectors, sub-sectors and activities
- a Default Emission Factor Handbook and
- a computer software package for data input and the calculation of sectorial, regional and national emission estimates.

The CORINAIR 1985 Inventory was developed in collaboration with the Member States, Eurostat, OECD and UNECE/EMEP.

The Inventory was completed in 1990 and the results have been published (Eurostat, 1991; CEC, 1995) and widely distributed in tabular and map forms.

Pending a decision on the location of the EEA, it was agreed in 1991 to produce an update of CORINAIR for 1990 (CORINAIR 1990). This update has been performed in co-operation with EMEP and IPCC-OECD to assist in the preparation of inventories required under the Long Range Transboundary Air Pollution (LRTAP) Convention and the Framework Climate Change Convention (FCCC) respectively.

The CORINAIR90 system was made available to :

- the 12 member states of the European Community in 1990: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and United Kingdom
- 5 EFTA countries: Austria, Finland, Norway, Sweden and Switzerland
- 3 Baltic States: Estonia, Latvia and Lithuania
- 9 Central and Eastern European countries: Albania, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia and
- Russia.

This collaboration:

- produced a more developed nomenclature (source sector split) - SNAP90 - involving over 260 activities grouped into a three level hierarchy of sub-sectors and 11 main sectors
- extended the list of pollutants to be covered to eight:
 - sulphur dioxide (SO₂)
 - oxides of nitrogen (NO_x)
 - non-methane volatile organic compounds (NMVOC)
 - ammonia
 - carbon monoxide
 - methane
 - nitrous oxide
 - carbon dioxide
- extended the number of sources to be considered as point sources (there were over 1400 large point sources in the CORINAIR85 inventory)
- recognised that an emission inventory needs to be complete, consistent and transparent
- extended the availability of the CORINAIR system to 30 countries
- increased awareness of CORINAIR and the need to produce an inventory within a reasonable time-scale to serve the requirements of the user community (policy-makers, researchers etc).

The CORINAIR 1990 Inventory recognises 11 main source sectors (as agreed with EMEP, see below):

- Public power, cogeneration and district heating plants
- Commercial, institutional and residential combustion plants
- Industrial combustion
- Production processes
- Extraction and distribution of fossil fuels
- Solvent use
- Road transport
- Other mobile sources and machinery
- Waste treatment and disposal
- Agriculture
- Nature.

Data are provided on large point sources on an individual basis and on other smaller or more diffuse on an area basis, usually by administrative boundary at the county, department level (NUTS level 3). The sources to be provided as point sources are:

- Power plant with thermal input capacity ≥ 300 MW
- Refineries
- Sulphuric acid plant
- Nitric acid plant
- Integrated iron/steel with production capacity > 3 Mt/yr
- Paper pulp plant with production capacity > 100 kt/yr
- Large vehicle paint plant with production capacity > 100000 vehicles/yr
- Airports with > 100000 LTO cycles/yr
- Other plant emitting ≥ 1000 t/yr SO_2 , NO_x or VOC
or ≥ 3000000 t/yr CO_2

The **Goal of CORINAIR90** is to provide a complete, consistent and transparent air pollutant emission inventory for Europe in 1990 within a reasonable time scale to enable widespread use of the inventory for policy, research and other purposes.

Completeness covers two aspects: the CORINAIR90 system is available to almost all countries of Europe and the SNAP90 nomenclature has been designed to provide a comprehensive list of activities generating emissions of the eight pollutants to be quantified.

Consistency will be provided by the systematic application of the CORINAIR methodology - by using the CORINAIR software and the SNAP90 nomenclature - to provide emission estimates.

Transparency will be achieved through the provision within the inventory of activity statistics/data and emission factors (or details of emission measurements where available) used to calculate emissions and through the supply of full references to the sources of these data.

Initial data from CORINAIR90 became available in early 1994 and the project was completed and a series of reports prepared during 1995 and early 1996.

The work was finalised and published by the EEA in 1996 and 1997 (see under section 5).

3.4 EMEP

The Cooperative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollutants in Europe (EMEP) formed by a Protocol under the Long Range Transboundary Air Pollution Convention has arranged a series of workshops on Emission Inventory Techniques to develop guidelines for estimation and reporting of emission data for

SO_x, NO_x, NMVOCs, CH₄, NH₃ and CO under the Convention. The 1991 Workshop agreed to recommend that:

- a task force on emission inventories should be established by the Executive Body of the Convention to review present emission inventories and reporting procedures for the purpose of further improvement and harmonisation, and
- the EMEP Steering Body should approve the guidelines prepared by the workshop for estimation and reporting for submission to the Executive Body of the Convention.

These guidelines included a recommendation that emission data should be reported as totals and at least for the 11 major source categories agreed with the CORINAIR project and other experts for the CORINAIR 1990 Inventory (see above).

The proposed task force was set up under the EMEP Steering Body with leadership from the United Kingdom and support from Germany and the European Community (including the European Environment Agency).

The objectives of the task force are to:

- provide a technical forum to discuss, exchange information and harmonise emission inventories including emission factors, methodologies and guidelines
- conduct in-depth evaluation of emission factors and methodologies in current operation
- co-operate with other international organisations working on emission inventories with the aim of harmonising methodologies and avoiding duplication of work.

The first meeting of the task force was held in London (UK) in 1992) and established eight expert panels to progress the work of the task force. The second meeting was held in Delft (Netherlands) in 1993 and agreed the specification for the joint EMEP/CORINAIR Emission Inventory Guidebook. The third meeting was held in 1994 in Regensburg (Germany) and reviewed first drafts of the Guidebook and considered how to integrate into the task force work previously developed by the task force on emission projections. The fourth meeting was held in 1995 in Oslo (Norway) and reviewed/assessed the second draft of the Emission Inventory Guidebook and considered how to develop the second phase of the Task Force. In 1995 the Executive Body agreed that the TFEI should continue beyond June 1995 and combine with the Task Force on Emission Projections to become the Task Force on Emissions Inventories and Projections (TFEIP). The subsequent meetings were held in 1996 in Oxford (UK) (5th), resulting in finalisation of the first edition of the Guidebook (EEA, 1996), in 1997 in Apeldoorn (Netherlands) (6th), in 1998 in Wismar (Germany) (7th) and in 1999 in Roskilde (Denmark) (8th), resulting in finalisation of the second edition of the Guidebook (EEA, 1999). Since then the TFEIP has met in Rome (Italy) in 2000 and in Geneva (Switzerland) in 2001, where revised EMEP reporting procedures were presented and discussed. Following this meeting the Task Force set up an editorial sub-group to revise and finalise these Guidelines, in response to comments received, for submission to the Steering Body. Following this the Steering Body adopted the new guidelines for estimating and reporting emissions data in principle for a pilot phase to allow Parties to apply them in the 2001 reporting round, while requesting the TFEIP to incorporate the comments made to the

extent possible, taking into account the comments made by National Experts and experience gained.

3.5 The IPCC/OECD/IEA Programme on National Greenhouse Gas Inventories

In February 1991 the OECD held a workshop in Paris on greenhouse gas emission inventory methodology to consider the OECD report 'Estimation of Greenhouse Gas Emissions and Sinks' (Background Report). The workshop produced (OECD, 1991) consensus on:

- a) a basic methodology document as the best available starting point for work on consistent national emission estimates and
- b) a proposed plan for a two-year programme of work to improve and disseminate the inventory methodology.

IPCC subsequently adopted the Work Programme to be carried out by IPCC Working Group 1 with support from OECD and IEA and recognised that method development effort should (IPCC, 1992):

- a) build on available information - both best available scientific data from ongoing research and currently available inventories and methods
- b) provide a simple default method accessible to all participating countries
- c) allow more detailed methods - those countries which have detailed emissions inventory capabilities should be encouraged to use them to provide the best possible data to the IPCC
- d) have careful documentation and review procedures to ensure consistency and transparency of results.

This Work Programme prepared Draft Guidelines for National Greenhouse Gas Inventories in three volumes - Reporting Instructions, Workbook and Reference Manual - in the six official languages of the United Nations for world-wide review during 1994. These guidelines were revised, updated and issued as a three volume set of Guidelines in early 1995 prior to the first Conference of the Parties held in Berlin in March-April 1995.

The Guidelines were revised in 1996 and 1997 through a series of expert workshops on agricultural soils, waste, new gases/industrial processes, land-use change and fuel combustion followed by a formal review process. This resulted in the three volume set "Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories" (IPCC/OECD/IEA, 1997).

The Guidelines cover the main sources of the three major greenhouse gases - CO₂, CH₄ and N₂O - and three additional groups of greenhouse gases - HFCs, PFCs and SF₆ but also prompt for emission estimates from three ozone precursors - NO_x, CO and NMVOC. Furthermore, it is likely that information may be requested on SO₂ and NH₃ (which are important in the formation of aerosols and hence cloud formation which may have a negative effect on global warming) and other greenhouse gases and precursors.

The IPCC Guidelines specifies six main sectors for reporting emissions and removals :

- All Energy (Combustion + Fugitive)
- Industrial Processes
- Solvent and other Product Use
- Agriculture
- Land Use Change and Forestry
- Waste.

The CORINAIR Technical Unit followed by the European Topic Centre on Air Emissions (ETC/AE) has been working closely with the IPCC/OECD/IEA to ensure compatibility between the joint EMEP/CORINAIR Atmospheric Emission Inventory Guidebook and reporting formats and the IPCC Guidelines and reporting formats. This was achieved by means of the preparation by ETC/AE of the revised SNAP97, distributed in 1998 and included in this Guidebook. SNAP97 is fully in line with the 1996 Revised IPCC Guidelines. Work to further harmonise EMEP and IPCC systems continues.

4 MULTI-MEDIA INTEGRATED INVENTORIES

General

In reviewing the requirements of the Fifth Environmental Action Programme (5EAP) 'Towards Sustainability' and developing the work programme for the EEA, the EEA Task Force has recognised the potential for extending the CORINAIR methodology to other media - a common, core set of relevant activity data would be collected and emission factors applied to these data to provide estimates of emissions or releases into all media - air, water and land - as well as waste.

An initial feasibility study carried out for the EEA-TF recommended that an integrated emission inventory should, in the long term, aim to:

- cover all the emittants relevant to the Fifth Environmental Action Programme
- cover emissions from both anthropogenic and natural sources
- include emissions to all the environmental media relevant to the Fifth Environmental Action Programme (air, surface waters, groundwaters, land)
- be capable of defining major point and line emission sources, as well as diffuse emissions
- be based upon a combined methodology of self-monitoring (for point sources) and centralised assessment (for non-point sources)
- be based on a modular structure, allowing data on emissions to be combined and aggregated by environmental medium, socio-economic activity/sector, product, geographic area etc according to need
- provide a survey of emissions on an annual cycle
- include rigorous procedures for data quality control and documentation
- provide support for access-by-request from *bona fide* users, including policy makers, scientists and public

- provide regular publications and summaries of results in an accessible form (including CD-ROM)
- be built upon the wide body of experience and data which already exist in member states and international agencies
- be managed to ensure that data are collated and stored at the most appropriate institutional level and that only data explicitly required at a European level need be transferred to the central co-ordinating agency
- be co-ordinated by the European Environment Agency with the support of a Topic Centre and national focal points.

To achieve these long-term aims, the report also recommended a number of steps to be taken, including

- the development of a conceptual model of emissions including sources, pathways and receiving media of concern
- development (in collaboration with Eurostat and other international statistics agencies) of a source classification, consistent with the general structure of the hierarchical NAPSEA nomenclature but covering other media and emission pathways and formally and explicitly linked to existing statistical classifications (for example NACE, ISIC, PRODCOM)
- development of a list of priority emittants
- definition of clear criteria for the identification and selection of point sources
- formulation of agreed reporting procedures
- definition of approved measurement methods
- establishment of a network of reporting agencies
- specification of inventory structure and database
- development of quality control procedures
- agreement on access conditions.

Finally, since an integrated inventory cannot be achieved in a single step, the report recommended that a phased approach should be adopted with piloting of some of the required features, as was carried out for CORINAIR with the 1985 inventory.

The feasibility study recognised a two-pronged strategy for developing integrated emission inventories, based on:

- the use of plant-specific information, where available from measurements, permits and registers developed for the purposes of emission abatement and control, and
- modelling emissions from appropriate activity data and emission factors for other sources.

This work is now continuing as part of the work programme of the European Environment Agency to progressively develop source-oriented inventories covering emissions to air, water and soil as well as waste releases and transfers.

IPPC Directive (PER)

In 1996 the EC Directive on Integrated Pollution Prevention and Control was adopted (Directive 96/61/EC). The purpose is to achieve integrated prevention and control of pollution arising from activities listed in Annex 1 of the Directive, through permits to be issued by the Member States. In 1997 a Committee has been formed according to Article 19 of the IPPC Directive to establish the format and particulars of the “inventory of principal emissions and sources responsible” (so-called Polluting Emissions Register or PER) provided for in Article 15(3) of the Directive. This inventory is to be based on data supplied by member states to DGXI. DGXI is required to report this inventory on a 3-yearly basis to Council and Parliament with the first inventory expected to be reported in 2002.

In 1997, 1998 and 1999 several meetings of the Committee and additional working groups have been held to discuss issues such as the list of substances to be reported, the use of threshold values for reporting, the definitions of the reporting unit (e.g. industrial site), the source nomenclature to be used (for example the NOSE-P system developed by Eurostat, assisted by EEA. NOSE-P means Nomenclature of Sources of Emissions, Processes). The EEA could assist the Commission in the collection, management and/or presentation of the data (from member states), in co-operation with Eurostat. Final decisions on the European PER are expected in 1999 or 2000.

The results of the European PER could eventually be fed into a future EEA Integrated Emissions Inventory (IEI), that would consist of emissions to air and water and generation of waste from large point sources (meaning IPPC installations in the European PER) and diffuse or “area” sources (e.g. transport, agriculture, small enterprises).

OECD/PRTR

The OECD has developed a guidance document for governments who are considering establishing a national pollutant release and transfer register (PRTR). The Guidance Manual for Governments, published in 1996 [OCDE/GD(96)32], was developed through a series of workshops which addressed the key factors countries should consider when developing a PRTR: why should a country establish a PRTR; what are the goals/objectives of the system and which chemical substances should be reported; how should the data be disseminated; and how should a PRTR system be implemented.

The OECD and the Environment Agency of Japan hosted in 1998 an international conference on Pollutant Release and Transfer Registers (PRTR). Representatives from 38 countries met in Tokyo to take stock of the progress and status of PRTRs world-wide and to discuss future directions for its use and design. The conference recommended that OECD countries should continue to set the example in implementing PRTRs and take the lead in sharing their experiences; that OECD should review its PRTR Guidance Manual for Governments and identify areas where supplemental policy and technical guidance might be needed to better share methodologies for estimating pollutant releases, verifying the data, standardising reports and comparing PRTR data across borders and using PRTRs to indicate cleaner technology and technology transfer opportunities; that international organisations should work together to

identify how a PRTR could be used to monitor commitments set forth in international environmental agreements; and that all countries without PRTRs should consider the initiation of a national system.

5 THE EUROPEAN ENVIRONMENT AGENCY

The European Environment Agency was established by EC Regulation 1210/90 (updated in 1999 (Regulation 933/1999) and commenced operation in Copenhagen on 30 October 1993.

The overall objective of the Agency as specified in the Regulation is “to provide the European Community and the Member States with objective, reliable and comparable information at European level enabling them to take the requisite measures to protect the environment, to assess the results of such measures and to ensure that the public is properly informed about the state of the environment”.

The geographical scope of the Agency’s work is not confined to Member States of the EU; membership is open to other countries that share the concerns of the EU and member states and the objectives of the Agency. Current membership includes all 15 EU states, as well as Iceland, Liechtenstein and Norway (EEA18 countries). Furthermore EEA co-operates with Central and Eastern and other European countries.

An important product of the EEA is its regular State of the Environment report, for example the report “Europe’s Environment: The Second Assessment”, published in June 1998 as an update of “Europe’s Environment: the Dobris Assessment” (1995) and the report “Environment in the European Union at the turn of the century” (1999).

The second Multiannual Work Programme for 1999-2003 was adopted by the Management Board of the Agency in 1999. The Regulation specifies that the Agency shall furnish information which can be directly used in the implementation of Community environmental policy and that it should give priority to a number of areas including atmospheric emissions.

As part of the first work programme the Agency in December 1994 designated five European Topic Centres to address inland waters, marine & coastal environment, air quality, nature conservation and air emissions respectively for a first 3-yearly work period, which was extended for a second 3-year period in 1998, ending by 31 December 2000.

The European Topic Centre on Air Emissions (ETC/AEM) is led by the Umweltbundesamt (UBA), Germany supported by a consortium of partners involving:

- Umweltbundesamt (UBA), Austria
- Centre Interprofessionnel Technique de la Pollution Atmosphérique (CITEPA), France
- POSEIDON, Greece and
- the European Network of Environmental Research Organisations (ENERO, which includes - NETCEN, United Kingdom
RISO, Denmark
ENEA, Italy
TNO, Netherlands).

The ETC/AE shall support national experts of EEA countries and ensure the delivery of high quality - reliable, comparable and timely - air emissions data relevant at the European level in the context of the EEA's mandate (EEA Regulation), objectives and work programme (EEA Annual Work Programme 2000 and Multi Annual Work Programme 1999-2003). Air emissions data are in particular required by EU legislation and the various international conventions and protocols. ETC/AE also contributes to the production of the main EEA state of the environment reports, where air emission estimates are needed for assessing the environmental problems climate change, ozone depletion, acidification, tropospheric ozone, dispersion of hazardous substances and urban air quality.

The main aim of the work programme of ETC/AE is to set up an annual European air emission inventory system (CORINAIR : CORE INventory of AIR emissions), including collecting, managing, maintaining and publishing the information, based on official national inventories (national total emissions, emissions by source sector, geographically distributed emissions).

ETC/AE assists participating countries to report their national emission inventories to the various international obligations in a consistent, transparent, complete and timely way, mainly by providing software and organising regular workshops. ETC/AE also checks to a limited extent national inventories before submission by the country, but the country is always responsible for the final official submission. ETC/AE makes available to participating countries a software package (CollectER, Collect Emission Register, and ReportER, June 1998) and a manual to enable the countries to report to all the international obligations. The software system makes use of the SNAP97 source nomenclature. In addition a software package with a report and a manual to estimate national emissions from road transport was made available (COPERT2, Computer Programme for estimating Emissions from Road Transport) to participating countries end of 1997 and a revised version in mid 1999 (COPERT3). COPERT3 includes most results from the DG VII (Directorate for Transport) programmes COST 319, the Estimation of Emissions from Transport, and MEET (Methodologies to Estimate Emissions from Transport).

Apart from the individual MS the European Community is also a Party to UNECE/CLRTAP and UNFCCC, requiring the European Community (Commission, DGXI) to report total EU15 emissions. ETC/AE is assisting the Commission in preparing these EU15 emission estimates as well as the necessary reports under the EC Monitoring Mechanism and to CLRTAP.

The ETC/AE has paid much attention the past years to reach full consistency between the CORINAIR and UNECE/CLRTAP/EMEP approach by developing jointly a emission source nomenclature SNAP97 (Selected Nomenclature for sources of Air Pollution) with CLRTAP/EMEP (the Co-operative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollutants in Europe) and its Task Force on Emission Inventories and Projections (TFEIP). In addition the SNAP97 nomenclature has been made fully compatible with the source nomenclature used in by the IPCC (Intergovernmental Panel on Climate Change) for reporting by countries to UNFCCC. Work to further harmonise EMEP and IPCC systems continue.

Since October 1998 EEA and ETC/AE work closely together with the DGI PHARE programme, and a PHARE Topic Link on Air Emissions (PTL-AE). PTL-AE has a contract of 2 years to perform similar activities as ETC/AE in the 13 PHARE Central and Eastern European countries, as ETC/AE performs for EEA countries.

Over the period until 1999 the ETC/AE has prepared the following EEA reports:

- Review of CORINAIR 90 - Proposals for Air Emissions 94, *Topic Report 6 (1996)*;
- Recommendations for Revised Data System, *Topic Report 12 (1996)*;
- CORINAIR 90 : Summary Report no 1 (Sectors), *Topic Report 7 (1996)*;
- CORINAIR 90 : Summary Report no 2 (Sub-sectors) , *Topic Report 8 (1996)*;
- CORINAIR 90 : Summary Report no 3 (Large Point Sources), *Topic Report no. 20 (1996)*;
- Updated CORINAIR software and Instructions for Use (Version 1.01b), September 1996;
- Annual Summary Report 1995, *Topic Report no. 9 (1996)*;
- Review study on European Urban Emission Inventories, *Topic Report no. 20 (1996)*;
- CORINAIR94 inventory, *Topic Report no. 8 (1997)*;
- Annual Summary Report 1996, *Topic Report no. 6 (1997)*;
- Air Pollution in Europe, *EEA Environmental Monograph No. 4 (1997)*;
- COPERT2 Computer Programme to Calculate Emissions from Road Transport, Methodology and Emission Factors, software User Manual, *Technical Report No. 5 and No. 6 (1997)*;
- Annual Topic Update 1997, *Topic Report no. 8 (1998)*;
- COPERT3, Methodology and Emission Factors, software User Manual, *final draft July 1999*;
- CollectER and ReportER software (version 1.0), Installation, User Guide, Manual, *final draft April 1999*;
- Overview of national programmes to reduce greenhouse gas emissions, *Topic Report no. 8 (1999)*;

- Annual European Community Greenhouse Gas Inventory 1990-1996, *Technical Report no. 19 (1999)*;

In addition ETC/AE has made the results of the CORINAIR90 and CORINAIR94 emission inventories available on its web site and in addition has prepared a database with time series of aggregated emissions estimates for all EU Member States, that is available for public access on the EEA web site (EEA Data Warehouse).

See for more information the EEA and ETC/AE web sites:

<http://eea.eu.int>

<http://etc-ae.eionet.eu.int/etc-ae/index.htm>

TASK FORCE ON EMISSION INVENTORIES AND PROJECTIONS

The Task Force on Emission Inventories (TFEI) was initiated in 1991 following agreement by the Executive Body for the Convention on Long-Range Transboundary Air Pollution. In 1995 the Executive Body agreed that the TFEI should continue beyond June 1995 and combine with the Task Force on Emission Projections to become the Task Force on Emission Inventories and Projections (TFEIP). The TFEIP Secretariat is from late 2003 provided by Norway and is supported by the other signatories to the Convention including the European Community, through the European Commission and the European Environment Agency (EEA).

The TFEIP is designed to assist in:

- the evaluation of the emission inventory requirements of the Co-operative Programme for Monitoring and Evaluation of Air Pollutants in Europe (EMEP);
- ensuring an adequate flow of reliable information to support the work under the Convention;
- accounting for the emission data needs of other relevant bodies under the Executive Body.

The objectives of the TFEIP are therefore:

- to provide a technical forum to discuss, exchange information and harmonise emission inventories including emission factors, methodologies and guidelines;
- conduct in-depth evaluation of emission factors and methodologies in current operation and
- co-operate with other international organisations working on emission inventories with the aim of harmonising methodologies and avoiding duplication of work.

The TFEIP meets these objectives through the holding of an annual meeting, the publication of a guidebook and through the operation of a number of expert panels. The first annual meeting of the TFEI was held in London in May 1992. Subsequent annual meetings have been held in Delft, Regensburg, Oslo, Oxford, Apeldoorn, Wismar, Roskilde, Rome and Geneva, Cordoba and Warsaw. The meetings are usually sponsored by the host country.

In 1993 the TFEI agreed a specification for the EMEP/CORINAIR Emission Inventory Guidebook (the 'Guidebook'). The first edition of the Guidebook was subsequently completed in 1996 and published and distributed by the EEA (on paper, CDROM and the EEA Internet site). The second edition of the Guidebook was officially launched in 1999 and was updated to the third edition in October 2001, and is subsequently updated with new/updated chapters following acceptance by the Steering Body every September.

The TFEIP currently operates four expert panels sponsored by signatories to the Convention. Individual members of the panels are drawn from across the whole of the UNECE area. Three technical panels cover the 11 main source categories of SNAP. In addition at their 2003 meeting, the TFEIP agreed to set up an expert panel on review. The following table lists the current expert panels, the sponsors of their secretariats and the relevant SNAP categories:

TFEIP Panel	Sponsors	SNAP Categories
Combustion and Industry	Nl, No, J.R.C.	1, 2, 3, 4, 5, 6, 9
Transport	It, EEA	7, 8
Agriculture and Nature	Ge, Dk	10, 11
Review	EEA, Sv	All categories

1 Guidebook Specification

1.1 The Purpose of the Guidebook

The aim of the Guidebook is to provide an up-to-date comprehensive summary of emission inventory methodology for each of the pollutants and sources to be quantified.

The Guidebook is systematically organised and will be maintained as the reference document for emission inventory methodology. It provides guidance on methodology that could be adopted/followed without making or suggesting that such adoption is mandatory. The methodology can be used for national, regional and local emission inventories.

1.2 The Structure of the Guidebook

The Guidebook is structured in Chapters with each chapter presenting information to a common format. The common format for each chapter will be a key feature of the Guidebook, designed to ensure that users (familiar or unfamiliar with the technical details of the area covered by each section) can readily locate and understand the essential aspects of the area covered.

Emission inventory nomenclature and hence the Guidebook will develop over time. The Third edition of the Guidebook addresses the source sector split and activity list given by SNAP97 (see CONTENTS) and the new Nomenclature For Reporting (NFR). The relationship between SNAP97, NFR and the IPCC96 formats is included in the CONTENTS list.

The EEA is also supporting development of a general environmental thesaurus, including surveys of nomenclatures used (or to be used) in different media and sectors, in order to obtain sets of common standard terms. Development of the Guidebook will need to be co-ordinated with this activity to help ensure harmonisation.

Each chapter of the Guidebook covers a homogeneous Source Sector, Sub-sector, Activity or Group of Activities as listed in SNAP97. For example, a Section might cover Sector 2 (Commercial, institutional and residential combustion) or Sub-sector 4.4 (Processes in inorganic chemical industries) or Activity 9.2.1 (Incineration of domestic or municipal wastes) or 3.3.1 (Combustion Plant ≥ 300 MW).

Each chapter should be as self-contained as possible. It should provide, in most cases, the main reference point for information and guidance on the essential requirements for compiling the emission estimates for the emission source covered. In some cases, the text will direct the user to supplementary documents and other relevant data sources that will help completion of this compilation.

An example of a supplementary document would be the 'COPERT 3' User Manual and computer program, which would need to be used in conjunction with the Guidebook to work up the required inventory for mobile emissions. Examples of other relevant data sources could be reports or on-line databases with information on Best Available Technology and/or emission factors used elsewhere (for example the IPCC 1996 Revised Guidelines for National Greenhouse Gas Inventories and subsequent IPCC documents on good practice and the US EPA's Air CHIEF system).

1.3 The Development of the Guidebook

The Guidebook will be developed via a procedure to track additions and updates, their source and dates of occurrence. A document to track these changes will be produced and kept up-to-date on the EEA web site (<http://reports.eea.eu.int/EMEP/CORINAIR3/en/>).

Updated versions of the Guidebook are only available through the Internet. The most recent draft chapters, prepared by expert panels between meetings of the TFEIP, will be circulated to relevant Expert Panel members for review. The final official version, which has to be approved by the TFEIP at its annual meeting and the subsequent Steering Body meeting of CLRTAP/EMEP, will be made available on the EEA Internet (web) site annually.

2 Guidebook Format

Subject to further development by the TFEIP, the common format for each Chapter is as follows (small changes have been introduced since the structure was agreed at the meeting of the Task Force held in Delft in May 1993):

**SNAP SECTOR, SUB-SECTOR OR
ACTIVITY CODE(S)**

**SOURCE SECTOR, SUB-SECTOR OR
ACTIVITY TITLE(S)**

NOSE CODE(S)

NFR CODE(S)

1. Activities included

Provides for chapters covering a source sector, sub-sector or parts thereof, codes and names for each of the activities covered within this chapter. Notes any related emission sources not included in the chapter.

2. Contribution to total emission

Provides tables summarising current state of knowledge on (a selection of) national and multi-national (CORINAIR, EMEP, OECD, UNFCCC) data on weight and percent contributions to total emissions for each relevant pollutant.

Sectors and sub-sectors producing more than one percent of total emissions of any pollutant should be disaggregated as far as practicable within these tables to show contributions from the main sub-sectors and/or activities producing at least one percent of the most significant pollutant.

3. General

3.1 Description

Provides a general introduction to explain what the section covers. Use ISIC, NACE, PRODCOM (or other)

	codes and definitions where these can help in the definition of the activities covered.
3.2 Definitions	Provides definitions of important terms.
3.3 Techniques	Describes the relevant techniques/technologies (reference may be given to additional sources of information).
3.4 Emissions	Presents the relevant pollutants and describes where and how they are emitted.
3.5 Controls	Describes the controls/abatement techniques available, how these have been introduced over time and their effects on emissions. Each of the above should include reference to the source of the definitions of terms and classification.
4. Simpler methodology	The purpose of the simpler methodology is to enable users to determine whether emissions from this activity are significant. Describes the minimum acceptable approach for quantifying emission from this source. The rationale for the approach should be presented and should have been confirmed as acceptable by several experts (some of whom will use this approach and some a more advanced approach). Appropriate base statistics and emission factors to be used should be clearly specified and explained.
5. Detailed methodology	The detailed methodology should be used for those sources that have been identified as significant. It describes the methodology, the benefits in terms of detail, improved accuracy and precision etc. and how it relates to the simpler approach. (In some case the simpler and detailed methodology may be the same).
6. Relevant activity statistics	Provides lists and possible sources of statistics/data on activities relevant to the estimation of emissions. Example activities are fuel consumption, traffic, industrial consumption/output and example data sources are national statistics offices, Eurostat, UNECE, OECD, IEA.
7. Point source criteria	Lists the current criteria to be used to split sources into point and area/line sources.
8. Emission factors, quality codes and references	Provides tables of emission factors for each pollutant, medium, technique, activity and fuel covered with associated quality codes and references (to the literature sources of the emission factors). Where appropriate and available, uncontrolled techniques should be given first and the temporal development of emissions/abatement should be included.
9. Species profiles	Provides available information on species profiles, for example NO _x and VOCs, with associated quality codes (8A-E) and references, as for emission factors above.
10. Uncertainty estimates	Provides current estimates in the uncertainties of base statistics, emission factors, disaggregation factors and emission estimates as percentages and/or quality codes

11. Weakest aspects/priority areas for improvement in current methodology	(A-E). Provides a summary of these aspects with suggestions/proposals on how they can be addressed or on how they are being addressed.
12. Spatial disaggregation criteria for area sources	Provides recommendations for activity or surrogate statistics to be used for spatial disaggregation.
13. Temporal disaggregation criteria	Provides a summary of what is known or what needs to be considered to disaggregate annual totals to shorter time periods.
14. Additional comments	Any comments not mentioned elsewhere, which may assist the estimation of emissions from this activity.
15. Supplementary documents	Provides a summary of documents which are to be used in conjunction with the Guidebook and which provide supplementary information necessary for completion of this part of the inventory, for example COPERT manuals.
16. Verification procedures	Describes verification procedures relevant to this section and who should apply them (national expert, central team, statistical office etc.). The Verification Expert Panel will provide advice/examples to the other Panel Leaders to help develop this section.
17. References	Provides list of references quoted within this section.
18. Bibliography	Provides a list of other relevant literature which is not referred to but which might be useful for extra background reading should further information be required.
19. Release version, date and source	Includes the chapter release version number, date of preparation or revision, list of author(s) plus people/organisations responsible for further updates.
20. Point of Enquiry	A current contact point for questions on the chapter.

3 Tasks for the Expert Panels

The current Expert Panels set up by the TFEIP are:

- Combustion and Industry Panel
- Transport
- Agriculture and Nature
- Review

The first three 'technical' panel leaders, with support from other members of the panel and from the review panel, will:

- a) Collect/review available information on activities and inventory methodology (emission estimates, emission factors, activity statistics etc.) allocated to the panel; this should include national and international methodologies for emission inventories using both emission factor and plant specific.
- b) consider the significance of each of these activities in terms of their contribution to emissions, the scope to sub-divide activities and the case for adding related activities (not included specifically in the latest nomenclature);
- c) prioritise the order in which activities will be addressed for inclusion in the Guidebook;
- d) consider the scope for simplifying the methodologies to be recommended so that they can be adopted by the widest range of countries yet maintain a reasonable level of accuracy. There is no point in recommending a methodology which requires detail beyond the available information or is beyond the financial resources of most countries or the time-scales of the inventory programme;
- e) prepare text, tables, figures etc. to the required format in priority order;
- f) circulate draft text etc. for review, correction, amendment by the rest of the panel;
- g) submit agreed text etc. to publisher or to lead panel;
- h) continue to collect data on activities already submitted in item 6 for later updates;
- i) liaise with lead/supporting panel leader as necessary;
- j) liaise with/participate in the Review expert panel;
- k) attend Co-ordination Group Meetings are required;
- l) make proposals for further research/study to improve the methodology.

The work plan of the newly formed expert panel on review has yet to be formalised.

GLOSSARY

CORINAIR - CORE INventory of AIR emissions. CORINAIR is a project performed since 1995 by the European Topic Centre on Air Emissions under contract to the European Environment Agency. The aim is to collect, maintain, manage and publish information on emissions into the air, by means of a European air emission inventory and database system. This concerns air emissions from all sources relevant to the environmental problems of climate change, acidification, eutrophication, tropospheric ozone, air quality and dispersion of hazardous substances. Before 1995 the CORINAIR project was developed under the CORINE programme of the EU (CO-ordination d'INformation Environnementale, a programme established by Council Decision 85/338/EEC). The geographical scope of the current CORINAIR project is the 15 EU Member States, Iceland, Liechtenstein, Norway, Bulgaria, Cyprus, Latvia, Malta, Slovenia and the Slovak Republic (EEA24 countries) and the remaining seven candidates for EU membership - the Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania and Turkey. For more information see: <http://etc-ae.eionet.eu.int/etc-ae/index.htm>

DG Environment - Directorate-General Environment of the European Commission, responsible for European Community policies for the environment, nuclear safety and civil protection. Its actions are carried out within the strategy defined in 1992 by the European Community Fifth Programme of Policy and Action in Relation to the Environment and Sustainable Development 'Towards Sustainability'. DG Environment is based in Brussels and Luxembourg. For more information see: http://europa.eu.int/comm/environment/index_en.htm

DGXI - Directorate-General XI of the European Commission, now called Directorate-General Environment. See DG Environment.

EEA - European Environment Agency was established by the European Union (EU) in 1993 with the objective to provide the Community and the Member States with objective, reliable and comparable information at the European level, enabling its member states to take the requisite measures to protect their environment, to assess the result of such measures and to ensure that the public is properly informed about the state of the environment. The EEA's mandate is defined by Council Regulation (EEC) No. 1210/90, updated in 1999 (Regulation 933/1999).

The geographical scope of the Agency's work is not confined to Member States of the EU; membership is open to other countries that share the concerns of the EU and member states and the objectives of the Agency. Current membership includes all 15 EU states, as well as Iceland, Liechtenstein, Norway, Bulgaria, Cyprus, Latvia, Malta, Slovenia and the Slovak Republic (EEA24 countries). The EEA co-operates with Central and Eastern and other European countries and the remaining seven candidates for EU membership — the Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania and Turkey - will become members of the Agency once they, too, ratify their EEA membership agreements. It is anticipated that they will do so in the near future, taking the Agency's membership to a total of 31 countries. For more information see: <http://www.eea.eu.int>

EMEP - the Co-operative programme for monitoring and evaluation of the long range transmission of air pollutants in Europe, linked to the Convention on Long-range Transboundary Air Pollution (see LRTAP). The main objective of the EMEP programme is to regularly provide Governments and subsidiary bodies under the LRTAP Convention with qualified scientific information to support the development and further evaluation of the international protocols on emission reductions negotiated within the Convention (LRTAP).

EMEP has three main components:

- collection of emission data for SO_x, NO_x, NMVOCs, CH₄, NH₃ and CO;
- measurement of air and precipitation quality;
- modelling of atmospheric dispersion.

At present, over 200 monitoring stations in 35 ECE countries participate in the programme. The work of EMEP is co-ordinated and approved by a Steering Body, which reports to the Executive Body of the Convention (LRTAP). In 1991 the Executive Body also established a Task Force on Emission Inventories (TFEI), to review present emission inventories and reporting procedures for the purpose of further improvement and harmonisation. See TFEI. For more information see <http://www.emep.int/index.html>

ENERO - the European Network of Environmental Research Organisations, which includes: NETCEN (UK), Risø (Denmark), ENEA (Italy), TNO (Netherlands).

ETC - European Topic Centre, an organisation appointed by the EEA for executing tasks on specific topics, including collecting, maintaining, managing and publishing data, analysing data and trends and assessing linkages with other information through integrated environmental assessment. For more information see: <http://www.eionet.eu.int/>

EU - the European Union, currently comprising of 15 Member States, namely Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, Sweden and the United Kingdom. For more information see: <http://www.europa.eu.int/>

Eurostat - the 'Statistical Office of the European Communities', whose mission is to provide the European Union with a high-quality statistical information service. Eurostat uses uniform rules to collect all statistical data from the National Statistical Institutes of each of the 15 Member States of the European Union. For more information see: <http://europa.eu.int/comm/eurostat/>

IEA - the International Energy Agency, based in Paris, is an autonomous agency linked with the Organisation for Economic Co-operation and Development (OECD). The IEA Secretariat collects and analyses energy data, assesses Member countries' domestic energy policies and programmes, makes projections based on differing scenarios and prepares studies and recommendations on specialised energy topics. For more information see: <http://www.iea.org/>

IPCC - the Intergovernmental Panel on Climate Change, which was established in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) to assess the available scientific, technical, and socio-economic information in the field of climate change.

The IPCC is organised into three working groups, the tasks of which are broadly:

Working group I: assesses scientific information on climate change;

Working group II: assesses environmental and socio-economic impacts of climate change;

Working group III: formulates response strategies in economic and social dimensions.

The IPCC released its Second Assessment Report in 1995 and continues to produce Technical Papers and develop methodologies (e.g. national greenhouse gas inventories) for use by Parties to the Climate Change Convention. The Third Assessment Report will be completed in the year 2000. For more information see: <http://www.ipcc.ch/>

LRTAP Convention - Long Range Transboundary Air Pollution - is the observed effect that air pollutants can travel several thousand kilometres before deposition and damage occurs (acidification, eutrophication, tropospheric ozone and dispersion of hazardous substances). To address this problem, the UN ECE Convention on Long Range Transboundary Air Pollution was signed in Geneva in 1979 and entered into force in 1983.

The Convention was the first internationally legally binding instrument to deal with problems of air pollution on a broad regional basis.

Since its entry into force in 1983 the Convention has been extended by eight protocols:

- the 1984 (Geneva) Protocol on Long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP);
- the 1985 (Helsinki) Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent;
- the 1988 (Sofia) Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes;
- the 1991 (Geneva) Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes;
- the 1994 (Oslo) Protocol on Further Reduction of Sulphur Emissions;
- the 1998 (Aarhus) Protocol on Heavy Metals;
- the 1998 (Aarhus) Protocol on Persistent Organic Pollutants (POPs);
- the 1999 (Gothenburg) Protocol to abate Acidification, Eutrophication and Ground-level Ozone.

Besides laying down the general principles of international co-operation for air pollution abatement, the Convention set up an institutional framework associating research and policy. The Executive Body's annual report sets out its work plan and its tentative calendar of meetings. For more information see:

<http://www.unece.org/env/lrtap/welcome.html>

MAP - control of Major Air Pollutants project, designed by the OECD to assess pollution by large scale photochemical oxidant episodes in Western Europe and evaluate the impact of various emission control strategies for such episodes.

The MAP emission inventory covered the following pollutants: SO₂, NO_x, and VOCs, including natural emissions.

The Project started in 1983 and the report on the work was published in 1990.

NFR – Nomenclature For Reporting –is a classification system developed by the UN/ECE TFEIP for the Reporting Guidelines described in eb.air.ge.1.2002.7.pdf

NOSE – Nomenclature of Sources of Emissions – the NOSE system has been developed by Eurostat to facilitate the description of emission sources in relation both to NACE Revision 1 branches and also to technical process characteristics, using the NOSE process list (NOSE-P) which has evolved from the CORINAIR SNAP94 nomenclature. Eurostat published the first version of the NOSE manual as a basis for testing of the NOSE system.

OECD - the Organisation for Economic Co-operation and Development, established in 1961, to provide governments of member countries with a forum in which to discuss, develop and perfect economic and social policy. There are currently 29 member countries. Through OECD they compare experiences, seek answers to common problems and work to co-ordinate domestic and international policies that increasingly in today's globalised world must form a web of even practice across nations.

Such exchanges may either lead to formal agreements, or, more often, they make for better informed work within individual governments and clarify the impact of national policies on the international community.

Over time, the OECD's focus has broadened to include extensive contacts with non-member economies, for example in the former Soviet Union. These contacts aim to further economic integration by making OECD's experience available to others and enabling the OECD to profit from the insights and perspectives of non-members. For more information see: <http://www.oecd.org/>

PRTR - Pollution Release and Transfer Register - an environmental database or inventory of potentially harmful releases to air, water and soil as well as wastes transported off site for treatment and disposal.

Facilities releasing one or more of the substances report periodically as to what they release, how much and to which environmental media. Data are then made available to interested parties. In addition to collecting data for PRTRs from stationary sources, some PRTRs are designed to include estimates of releases from diffuse sources such as agricultural and transport activities based on other data elements (e.g. number of automobiles).

The development and implementation of a PRTR system adapted to national needs represent a means for governments to track the generation, release and the fate of various pollutants

over time. A PRTR can be an important tool in the total environment policy of a government, providing otherwise difficult to obtain information about the pollution burden, encouraging reporters to reduce pollution, and engendering broad public support for government environmental policies.

In 1996 the OECD published the 'Guidance Manual for Governments' [OCDE/GD(96)32], which addresses the key factors countries should consider when developing a PRTR. For more information see: <http://www.oecd.org//ehs/prtr/index.htm>

SNAP - Selected Nomenclature for sources of Air Pollution - developed as part of the CORINAIR project for distinguishing emission source sectors, sub-sectors and activities.

TFEI - the Task Force on Emission Inventories which was established in 1991, following agreement by the Executive Body for the Convention on Long-Range Transboundary Air Pollution (LRTAP), to support the work of EMEP. It is sponsored by Members of the United Nations Economic Commission for Europe (UN ECE). In 1995 it was merged with the Task Force on Emission Projections to become the Task Force on Emission Inventories and Projections (TFEIP).

For more information on the TFEI, see the previous chapter (AETF).

TFEIP – see TFEI

TRI - the Toxic Release Inventory - of the US EPA provides the first comprehensive overview of toxic chemical pollution from manufacturing facilities in the United States. For more information see: <http://www.epa.gov/tri/>

UN ECE - the United Nations Economic Commission for Europe is the forum at which the countries of North America, western, central and eastern Europe and central Asia come together to forge the tools of their economic co-operation. UN ECE is a forum for dialogue aimed at bringing about better understanding and agreement on common guidelines and policies, and where agreements exist to negotiate and assist activities prepared. Its main purpose is to harmonise the policies and practices of its member countries, to facilitate economic exchange investment and the integration of transport networks, and to make environmental procedures more effective. For more information see: <http://www.unece.org/>

UNFCCC - the United Nations Framework Convention on Climate Change is the main international agreement through which countries are addressing the issue of climate change. The Convention sets an ultimate objective of stabilising 'greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system'. The 1992 Convention took effect in 1994 and the Treaty was signed by 165 states. In 1997 the Kyoto Protocol was established, since then signed by approx. 84 states and ratified/acceded to by approx. 40 states, but it has not yet entered into legal force as it has not been ratified by the requisite number of countries. For more information see: <http://www.unfccc.de/>

US EPA - the United States' Environmental Protection Agency, whose missions is 'to protect human health and to safeguard the natural environment - air, water, and land - upon which life depends'. For more information see: <http://www.epa.gov>

Glossary of Pollutants

CH₄ - Methane

CO - Carbon Monoxide

CO₂ - Carbon Dioxide

HFCs - HydroFluoroCarbons

HM - Heavy Metals (e.g. Lead, Cadmium and Mercury etc)

NH₃ - Ammonia

NMVOCs - Non-Methane Volatile Organic Compounds

NO_x - Oxides of Nitrogen

N₂O - Nitrous Oxide

NO - Nitric Oxide or Nitrogen Monoxide

NO₂ - Nitrogen Dioxide

PAHs – Polycyclic Aromatic Hydrocarbons

PFCs – PerFluoroCarbons

PM_{2.5} – Ultra-Fine Particulates, size 2.5 µm or less

PM₁₀ – Fine Particulates, size 10 µm or less

POPs - Persistent Organic Pollutants (e.g. Polychlorinated Biphenols, Dioxins, etc.)

SF₆ - Sulphur Hexafluoride

SO₂ - Sulphur Dioxide

TOPs - Total Ozone Precursors, includes: NO_x, NMVOCs, CO and CH₄

TSP – Total Suspended Particulates

VOCs - Volatile Organic Compounds