

“Capacity Building and Strengthening Institutional Arrangement”

Analysis and sampling of air and air pollution

Integrated system of information concerning the emissions of pollutant substances into the air

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AIR POLLUTION AND ENVIRONMENTAL IMPACTS

Compile the air emission inventory

- To quantify the level of air pollution, identify the key sources and evaluate the impact on the human health and on materials, by means of appropriate models;
- To develop abatement strategies and individuate priorities by means of cost-effects analysis and integrated models (such as RAINS);
- To verify the effect at different levels (sectorial, national and international) of policies and measures adopted to reduce emissions

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Compile the air emission inventory (cnt)

- To verify the interaction between sectorial policies, economical accounts and environmental impacts;
- To provide accessible and comparable information to the public by means of indicators;
- To verify the respect of the National emission ceilings and emission reduction engagements in the different International context.

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Main international requirements

- UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP, 1979), with the relevant Protocols. Pollutants involved: SO₂, NO_x, NH₃, NMVOC, CO, HMs (Cd,Pb,Hg), POPs (Dioxins and Furans, PAH), annual reporting, following the EMEP/CORINAIR methodology.
- UNFCCC Convention on Climate Change and the Kyoto Protocol. Direct greenhouse gases CO₂,CH₄,N₂O, HFCs, PFCs, SF₆, and indirect SO₂, NO_x ,NMVOC, CO should be yearly reported, the IPCC methodology is suggested.

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Other reporting requirements for EU Member States

- Large Combustion Plant Directive (1988, amended in 2002): SO₂, NO_x (annual reporting, no additional methodologies or guidelines)
- Directive on Ozone and National Emission Ceilings for certain pollutants (1999), containing reference to the same guidelines and methodologies as used in CLRTAP
- Integrated Pollution Prevention and Control Directive (1996) and the related Commission Decision on a European Pollutant Emission Register (Commission Decision, adopted Jan. 2000). Emissions in air and water from specified industrial sources for a list of 50 substances should be reported every three years and specific guidance has been developed (2001)

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Pollutants involved by environmental themes

Pollutant	Acidification	Tropospheric Ozone	Toxic Pollutants	Climate Change
Sulphur Dioxide, SO ₂	✓			
Nitrogen Oxides (NO _x + NO ₂), NO _x	✓	✓	✓	
Ammonia, NH ₃	✓			
Non-methane Volatile Organic Compounds, NMVOC		✓	✓ ¹	
Carbon Monoxide, CO		✓	✓ ¹	
Carbon Dioxide, CO ₂				✓
Methane, CH ₄		✓		✓
Nitrous Oxides, N ₂ O				✓
Hydrofluorocarbons, HFC				✓
Perfluorocarbons, PFC				✓
Sulphur Hexafluoride, SF ₆				✓
Heavy Metals (Hg, Pb, Cd)			✓	
Particulate Matter <10µg			✓	
Persistent Organic Pollutants (Dioxins/Furans, PAH)			✓	

1: Some specific species such as benzene and 1,3-butadiene

2: Not toxic at general ambient concentrations

3: Ozone is also a greenhouse gases and therefore NO_x, NMVOC and CO have an indirect effect on climate change. Furthermore aerosols containing sulphates and nitrates have a local cooling effect and thereby also SO₂ and NH₃ have an indirect effect on climate change.

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Quality of inventory data according to the UNFCCC and UNECE

- Transparency: the assumptions and methodologies should be clearly explained to facilitate replication and assessment
- Consistency: the inventory should be internally consistent in all its elements with inventories of other years
- Comparability: the estimates reported by Parties should be comparable among Parties
- Completeness: the inventory should cover all sources and sinks included in the IPCC Guidelines
- Accuracy: the inventory should not be systematically either over or under true emissions and removals, and uncertainties should be reduced as far as practicable

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Inventory reporting requirements for all UNFCCC Parties

■ Article 4.1 of the UNFCCC

All Parties shall develop, periodically update, publish and make available to the COP national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol

■ Article 12 of the UNFCCC

Each Party shall communicate to the COP... a national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol..., using comparable methodologies to be promoted and agreed upon by the COP

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Inventory reporting requirements for UNFCCC Annex 1 Parties

- COP 1 (Berlin, 1995) requested Annex I Parties to report national inventory data on annual basis by 15 April of each year and to adopt the IPCC guidelines for national inventory
- COP5 (Bonn, 1999) adopted the UNFCCC guidelines on reporting and review (FCCC/CP/1999/7): request for inventory reporting according to the new Common Reporting Format (CRF) and the submission of a National Inventory Report

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National Inventory System

- As required by article 5.1 of the Kyoto Protocol, Annex I Parties shall have in place a National System by the end of 2006 at the latest for estimating greenhouse gas emissions and for reporting and archiving inventory information
- A National System should involve and attribute specific roles and responsibilities to the different institutions which should collect and communicate basic data necessarily and timely for the inventory compilation
- The Italian Atmospheric Emission Inventory and the Italian Greenhouse Gas Inventory are entirely compiled and maintained by the Environment Agency (APAT)

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National Inventory System (cnt)

Different institutions responsible for statistical data flow and publications are part of the National Statistical Program (SISTAN) approved annually and published by a Prime Minister Decree (DPCM).

For GHG inventory, basic data are:

- energy statistics published by the Ministry of Production Activities in the National Energy Balance
- statistics on industrial and agricultural production published by the National Statistics Institute
- statistics on transportation provided by the Ministry of Transportation

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Source of activity data

SECTOR	ACTIVITY DATA	SOURCE
1 Energy		
1A1 Energy Industries	Fuel use	Energy Balance - Ministry of Production Activities Major national electricity producers
1A2 Manufacturing Industries and Construction	Fuel use	Energy Balance - Ministry of Production Activities Major National Industry Corporation
1A3 Transport	Fuel use Number of vehicles Aircraft landing and take-off cycles and maritime activities	Energy Balance - Ministry of Production Activities Statistical Yearbooks - National Statistical System Statistical Yearbooks - Ministry of Transportation
1A4 Residential-public-commercial sector	Fuel use	Energy Balance - Ministry of Production Activities
1B Fugitive Emissions from Fuel	Amount of fuel treated, stored, distributed	Energy Balance - Ministry of Production Activities Statistical Yearbooks - Ministry of Transportation Major National Industry Corporation
2 Industrial processes	Production data	National Statistical Yearbooks- National Statistics Institute International Statistical Yearbooks-UN
3 Solvent Use	Amount of solvent use	National Environmental Publications - Sectoral industrial associations International Statistical Yearbooks - UN
4 Agriculture	Production data Number of animals Fertiliser consumption	Statistical Yearbooks - National Statistics Institute
5 Land use change and forestry	Forest and soil surfaces Amount of biomass Biomass burnt Biomass growth	Statistical Yearbooks - National Statistics Institute State Forestry Corps National and Regional Forestry Inventory Universities and research institutes
6 Waste	Amount of waste	Agency for the Protection of the Environment and for Technical Services National Waste Observatory