

“Capacity Building and Strengthening Institutional Arrangement”

Workshop: “Hazardous Waste”

**Contaminated Sites:
The extent of the problem in Europe.
Inventory and Assessment of the
European Environment Agency**

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APAT

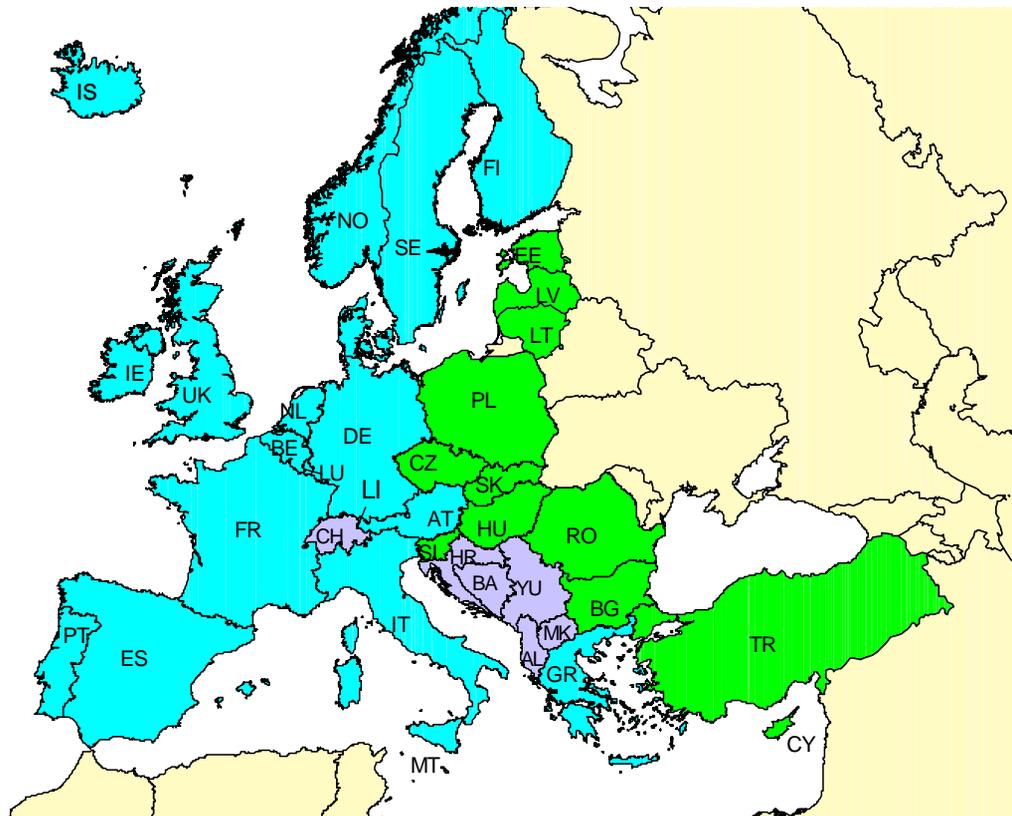
Agency for Environmental Protection and Technical Services

Index

1. Background on EEA activities
2. The indicator “Progress in the management of contaminated sites”
3. Current status

1. Background on EEA activities

EEA members and participating countries



- Old members
- New members
- Cooperating countries



1. Background on EEA activities

EEA main tasks

- Making **environmental information** accessible
- **Networking** – Implement and coordinate the EIONET (European Environmental Observation and Information Network)
- **Reporting** – Prepare regular reports on the state and trends of the environment
- Annual budget of approx. 30 Meuro, about 150 staff, 5 European Topic Centres (ETCs)
- Presently the ETC/LUSI (Land Use and Spatial Information) is taking care of updating the inventory and assessment of contaminated sites in Europe

1. Background on EEA activities

Eionet

<http://eionet.europa.eu/>

Environmental information network including more than 300 national institutions and 900 experts from 37 countries:

- National Focal Points
- European Topic Centres
- National Reference Centres
- Main component elements

- National members are nominated by countries

- Covers a broad range of environmental issues

- Aims at:
 - improving capacity building in Member States
 - streamlining data flows originated from reporting obligations

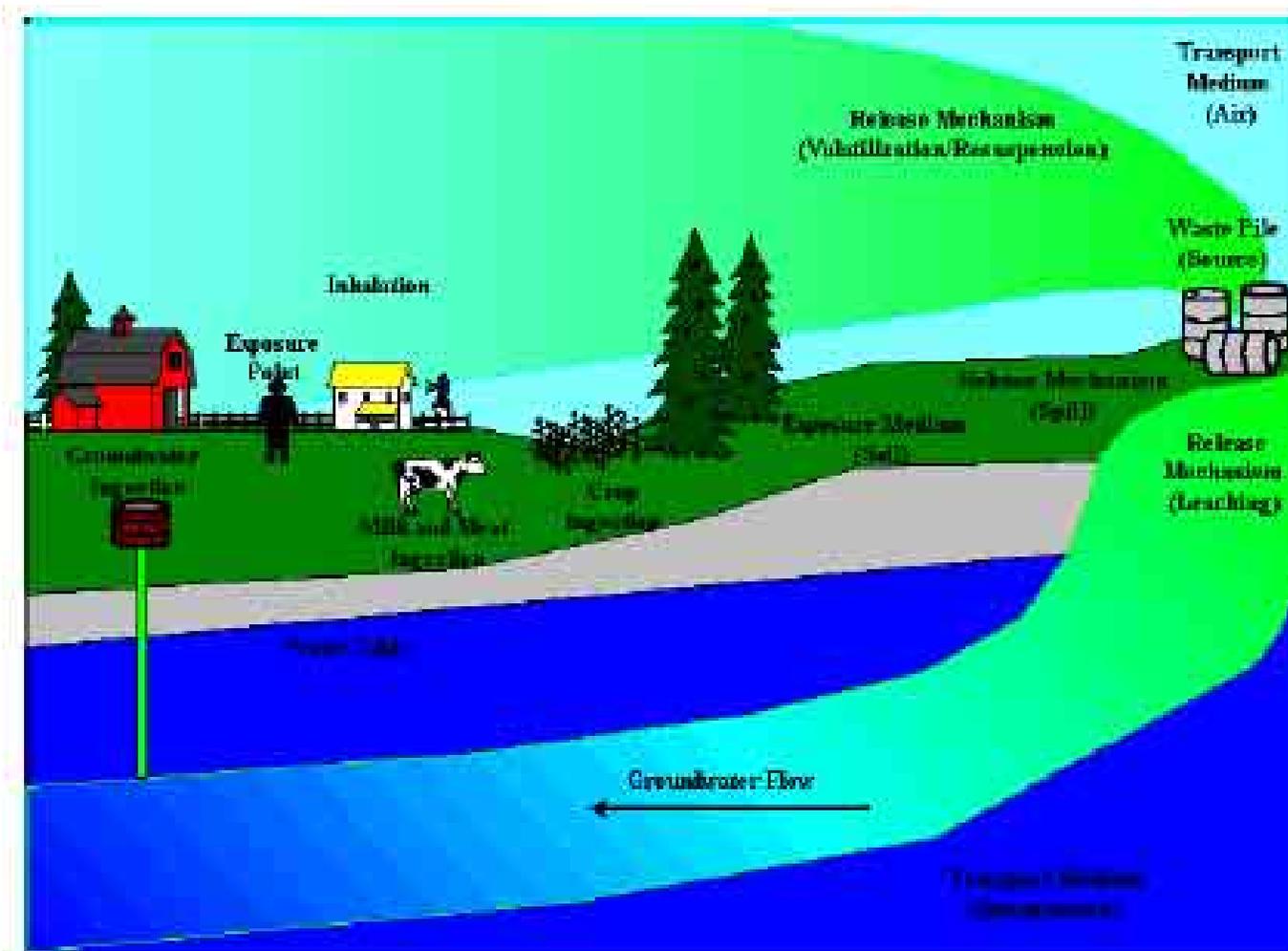
1. Background on EEA activities

Soil contamination from local sources in Europe

- Soil contamination from localised sources is often related to:
 - industrial plants no longer in operation
 - past industrial accidents
 - improper municipal and industrial waste disposals.
- In addition, at still operating industrial plants, soil contamination often has its origin in the past, and current activities still have significant impacts (EEA-UNEP, 2000).

1. Background on EEA activities

Release and dispersion mechanisms from waste disposal



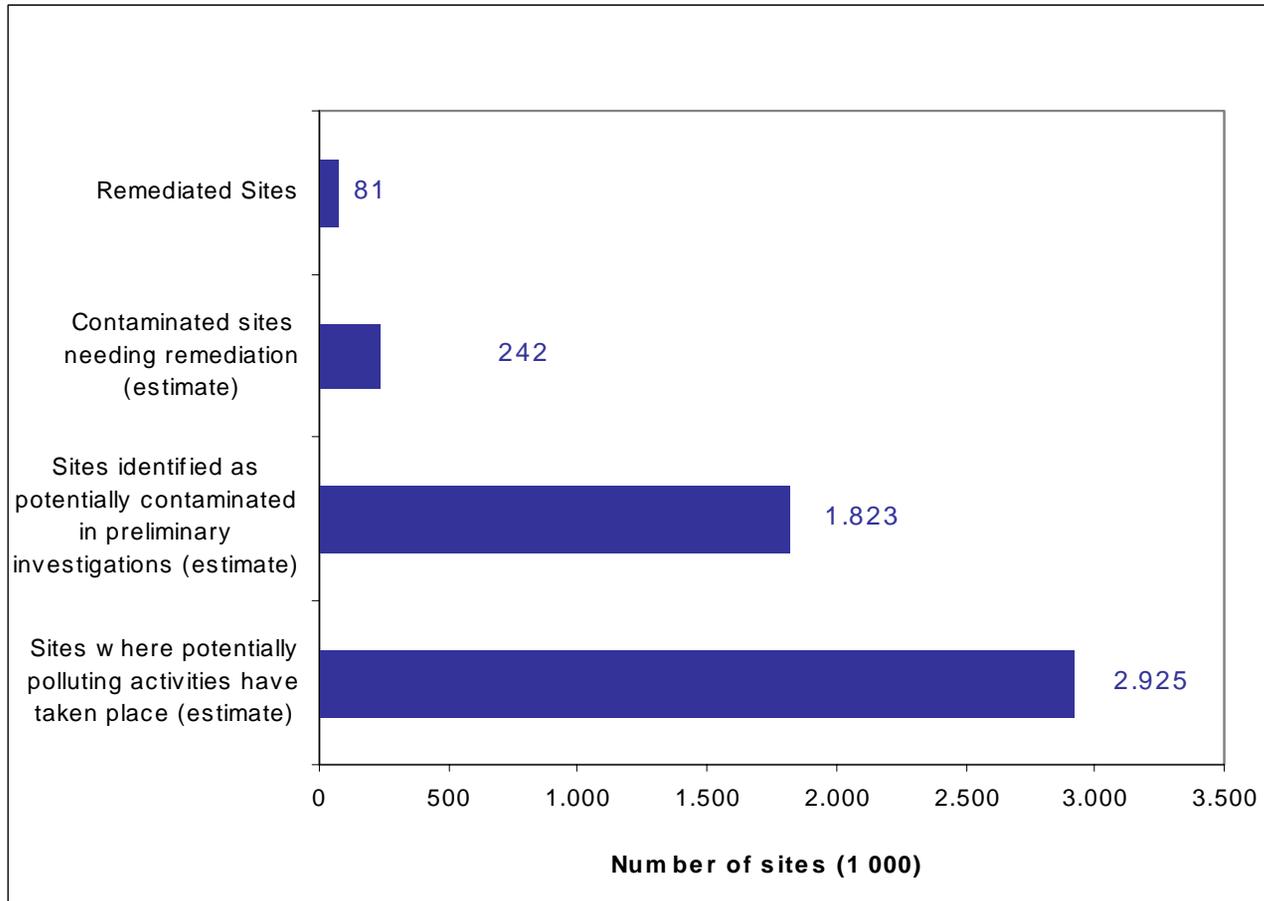
2. The indicator “Progress in the management of contaminated sites”

Inventories and classifications of sites

- Effects of industrial activity (either historical or currently in operation) that pose a risk to soils and groundwater, and the spectrum of the various polluting activities, vary among EU countries.
- National policies for the management of contaminated land and their stage of application, differ under several aspects.
- These variations may result in different classification systems and in incomplete information being available in some countries.
- This is why it is difficult to complete inventories of contaminated sites at the European level.

2. The indicator “Progress in the management of contaminated sites”

Overview of progress in the management of contaminated sites in Europe

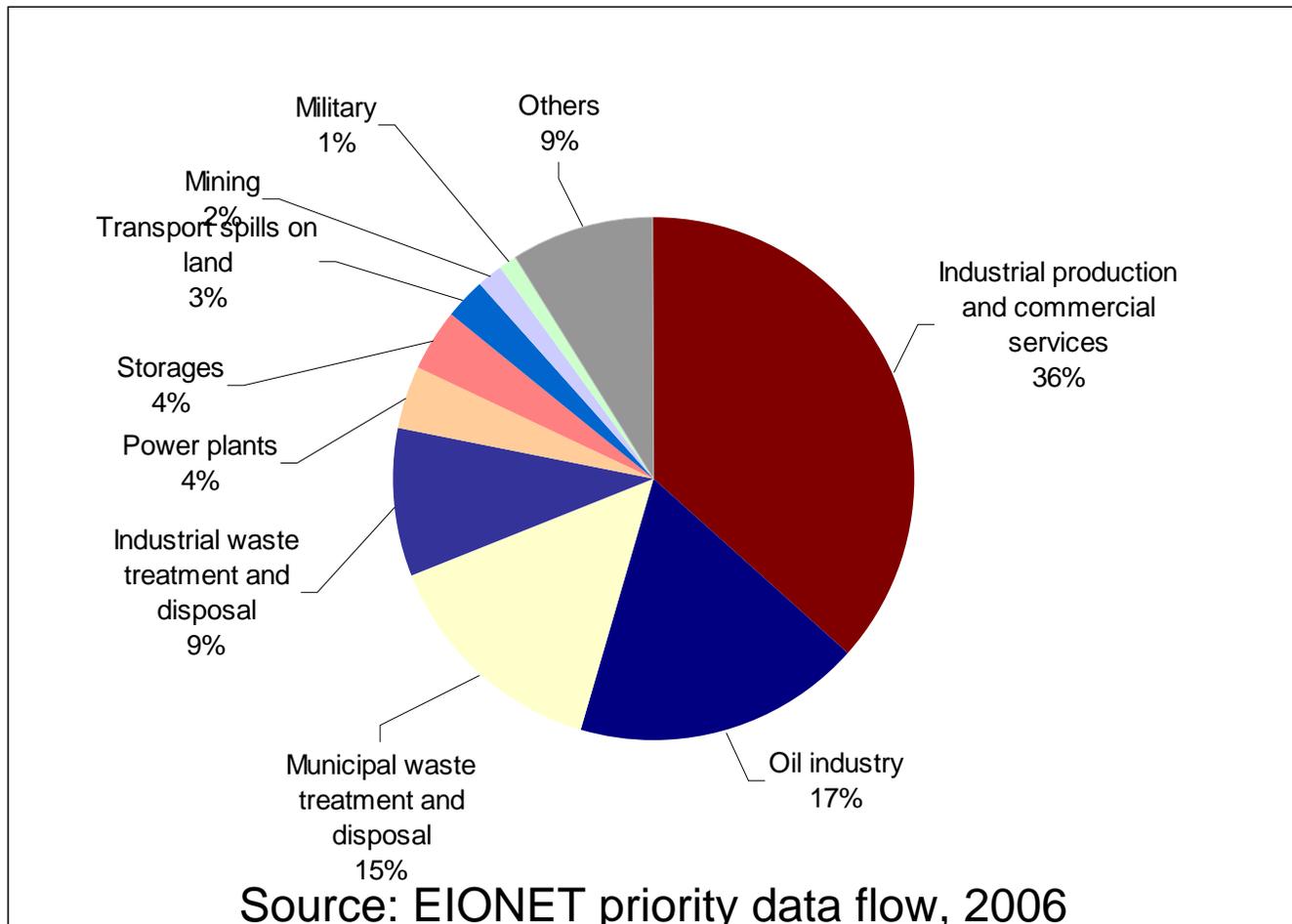


Country
Austria
Belgium
Bulgaria
Croatia
Czech Rep.
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Liechtenstein
Lithuania
Luxembourg
FYR of Macedonia
Malta
Netherlands
Norway
Romania
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom

Source: EEA/EIONET priority data flow, 2006

2. The indicator “Progress in the management of contaminated sites”

Overview of activities causing soil contamination in Europe



2. The indicator “Progress in the management of contaminated sites”

Typical contaminants found at sites related to activities

<i>Past activities conducted on the site</i>	Typical contaminants
Agriculture	VOCs, arsenic, copper, carbon tetrachloride, ethylene dibromide and methylene chloride, pesticides, insecticides, herbicides, grain fumigants
Automobile refinishing and repair	Some metals, metal dust and metal sludges, various organic compounds, solvents, paints and paint sludges, scrap metal, waste oils, acids and alkalis
Battery recycling and disposal	Heavy metals (Pb, Cd, Ni, As, Cu, Hg, Cr, At, etc.) and metals, and acids
Chloro-alkalis manufacturing	Chlorine compounds, mercury
Coal gasification	PAHs, BTEX, creosote, phenolics, sulphur compounds, chloride compounds, cyanide, aluminium, iron, lead, nickel, chromium, arsenic
Cosmetic manufacturing	Heavy metals, dusts, different type of solvents, acids
Dry cleaning activities	Chlorinated aliphatics, such as chloroform and tetrachloroethane, various solvents, spot removers, fluorocarbon 113, perchloroethylene and its dechlorination break down products
Dye facilities	2-naphthylamine, 4-aminobiphenyl, benzedrine and other organic solvents, aromatics, phosphates, sulphates, nitrites, chromium, zinc
Electroplating operations	Metals such as cadmium, chromium, copper and nickel, cyanide, chlorofluorocarbons and other solvents
Glass manufacturing	Arsenic and lead, acids and alkalis
Herbicide manufacturing and use	Dioxin, metals, herbicides (dangerous halogenated organic compounds and others)
Hospitals	Formaldehyde, radionuclides, photographic chemicals, solvents, mercury, ethylene oxide, chemotherapy chemicals, pathogens

From CLARINET Report:

Remediation of Contaminated Land Technology Implementation in Europe

2. The indicator “Progress in the management of contaminated sites”

Typical contaminants found at sites related to activities

<i>Past activities conducted on the site</i>	Typical contaminants
Incinerators	Dioxins, various municipal and industrial waste, ash and slags with dangerous compounds, ordnance compounds, metals, sulphuric acid and waste from cleaning gas system
Landfills- municipal and industrial	Metals, VOCs, PCBs, ammonia, methane, household products and all kind of detergents, pesticides, diversified wastes, hydrogen sulphide, batteries, medicines, photo-chemicals, acids and alkalis
Leather treatment and manufacturing	BTEX and other solvents, paints and dyes, chromium and sludges with chromium
Machine shops/metal fabrication	Metals, VOCs, dioxins, beryllium, degreasing agents, solvents, waste oils, metal wastes
Marine maintenance industry	Solvents, paints, cyanide, acids, VOC emissions, heavy metal sludges, degreasers, waste oils, acids and alkalis
Munitions manufacturing	Lead, explosives, copper, antimony, mercury, unexploded ordnance (UXO), sludges with heavy metals and solvents
Paint/ink manufacturing	Metals (such as chromium, cadmium, lead, and zinc), VOCs, chloroform, ethylbenzene, other solvents, paints, inks, waste paints and sludges
Pesticide manufacturing	VOCs, arsenic, copper, pesticides, insecticides, herbicides, fungicides, xylene, chlorinated organic compounds, solvents, acids and alkalis
Petroleum refining and use	Petroleum hydrocarbons, PAH's, BTEX, fuels, oil and grease, acids, sludges with hydrocarbons and dangerous substances
Pharmaceutical manufacturing	Heavy metals (essentially lead), various organic chemicals, organic solvents
Photographic manufacturing and uses	Silver, bromide, methylene chloride, solvents, photographic products and residues from this industry

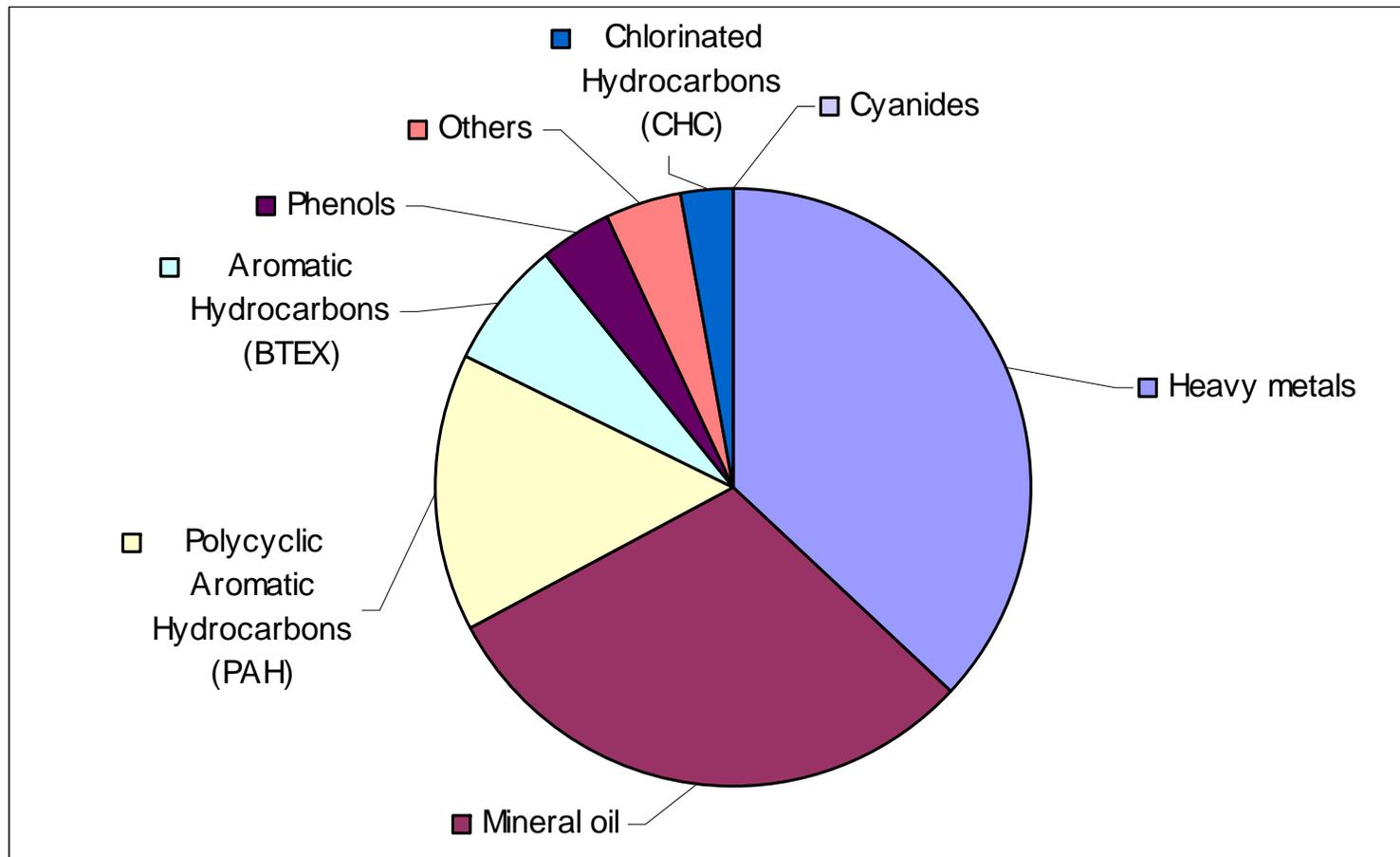
2. The indicator “Progress in the management of contaminated sites”

Typical contaminants found at sites related to activities

<i>Past activities conducted on the site</i>	Typical contaminants
Plastic manufacturing	Polymers, phthalates, cadmium, solvents, resins, chemical additives, acids and alkalis, oils, waste additives and sludges with dangerous substances
Printing industry	Silver, solvents, acids, waste oils, inks and dyes, toner, photographic chemicals, waste etching solutions, contaminated sludges
Railroad yards	Petroleum hydrocarbons, VOCs, PAH's, BTEX, solvents, fuels, oil, and grease, lead, PCBs
Research and educational institutions	Inorganic acids, organic solvents, metals and metal dust, photographic waste, waste oil, paint, heavy metals, pesticides
Scrap metal operations	Various metals and heavy metals (such as Pb and Ni), PCBs, PCT, dioxin, transformers, oil filters, asbestos, brake and antifreezing fluids, explosive components
Semiconductor manufacturing	Metals, VOCs, carbontetrachloride, degreasing agents, solvents, phosphoric acid??
Smelter operations / mining activities	Metals and heavy metals (such as Pb, Cu and As), dust, ash, slag, metal sludges, mineral oils, acids and alkalis
Underground storage tanks	Solvents, metals, POLs, BTEX, gasoline, diesel fuel
Wood pulp and paper manufacturing	Chlorinated organic compounds, dioxins, furans, chloroform, acid resins, mineral oils
Wood preserving	Creosote, PCP, arsenic, chromium, copper, zinc, PCBs, PAHs, beryllium, dioxin, wood preservatives, solvents, mineral oils
Inorganic chemical processes	Acids and alkalis, solutions and sludges with heavy metals, wastes with asbestos, solutions and slags with dangerous substances
Organic chemical processes	General organic chemicals (halogenated and not halogenated solvents, washing liquids, mother liquors)

2. The indicator “Progress in the management of contaminated sites”

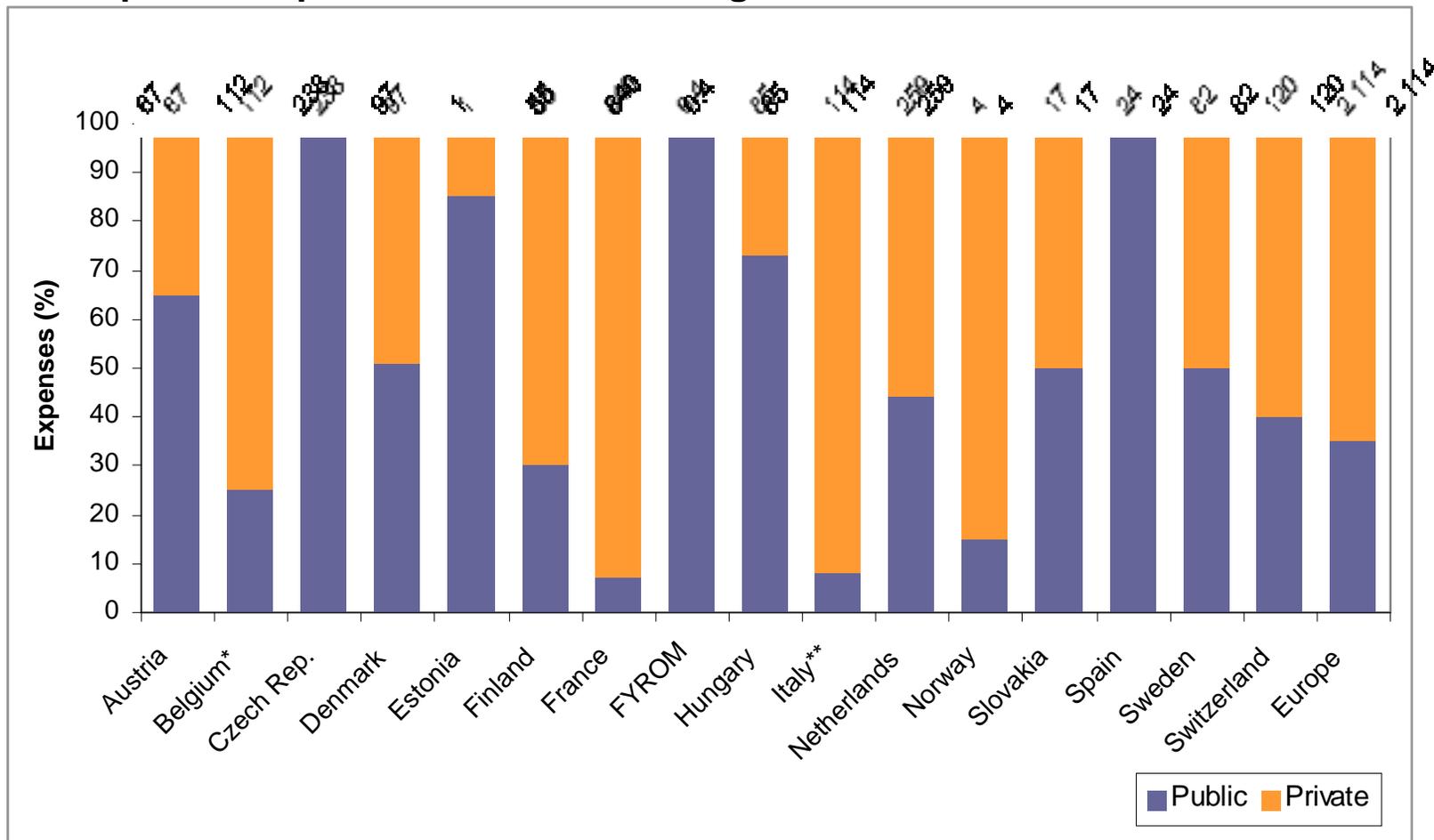
Overview of contaminants affecting soil and groundwater in Europe



Source: EIONET priority data flow, 2006

2. The indicator “Progress in the management of contaminated sites”

Public and private expenditures for the management of contaminated sites



Values on top: total annual management expenditures (Meuro)

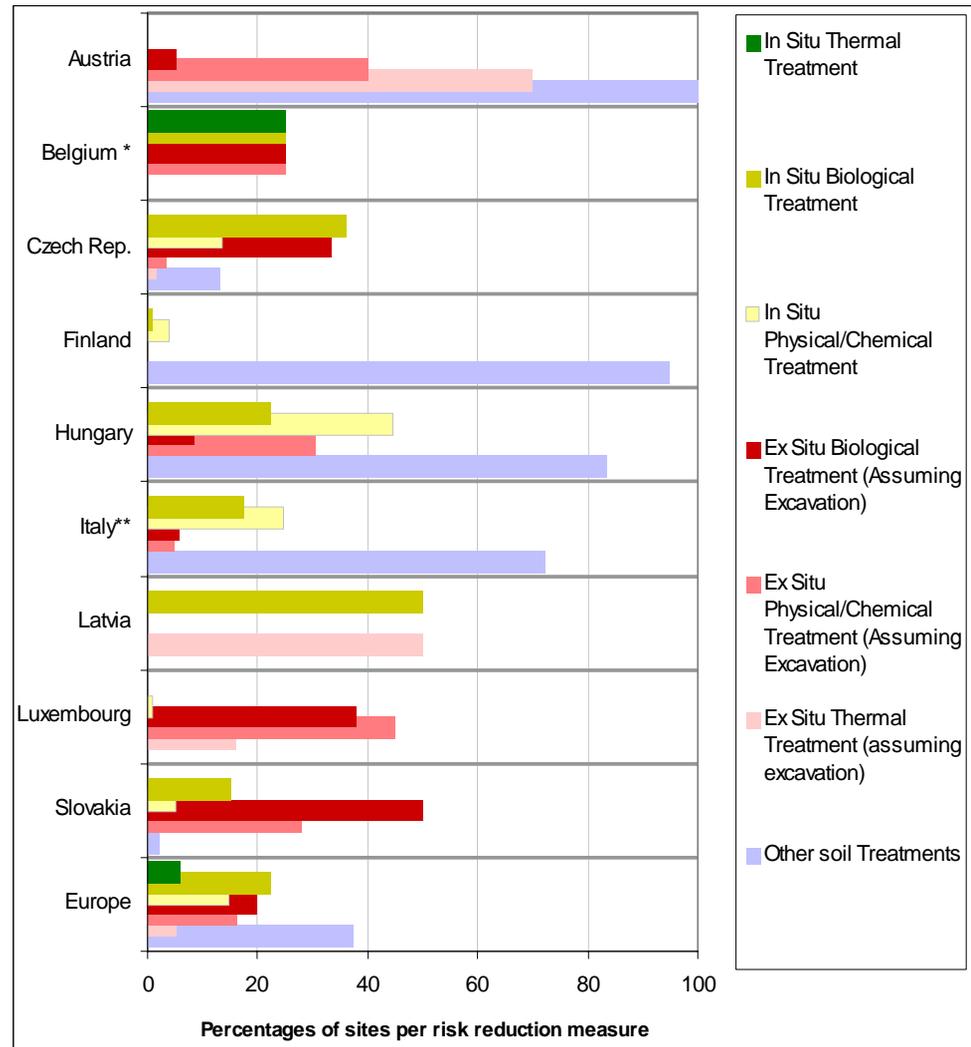
2. The indicator “Progress in the management of contaminated sites”

Expenditures

- Although the “polluter-pays” principle is generally applied, a huge sum of public money - on average 25% of total expenses - has to be provided to fund necessary remediation activities, which is a common factor across Europe.
- Annual expenditures vary from 35 to under 2 Euro per capita in the various countries over the past four years.
- Even though considerable amount of money has been spent on remediation activities already, the share compared to the total estimated remediation costs is relatively low over the last years (maximally 8 %).

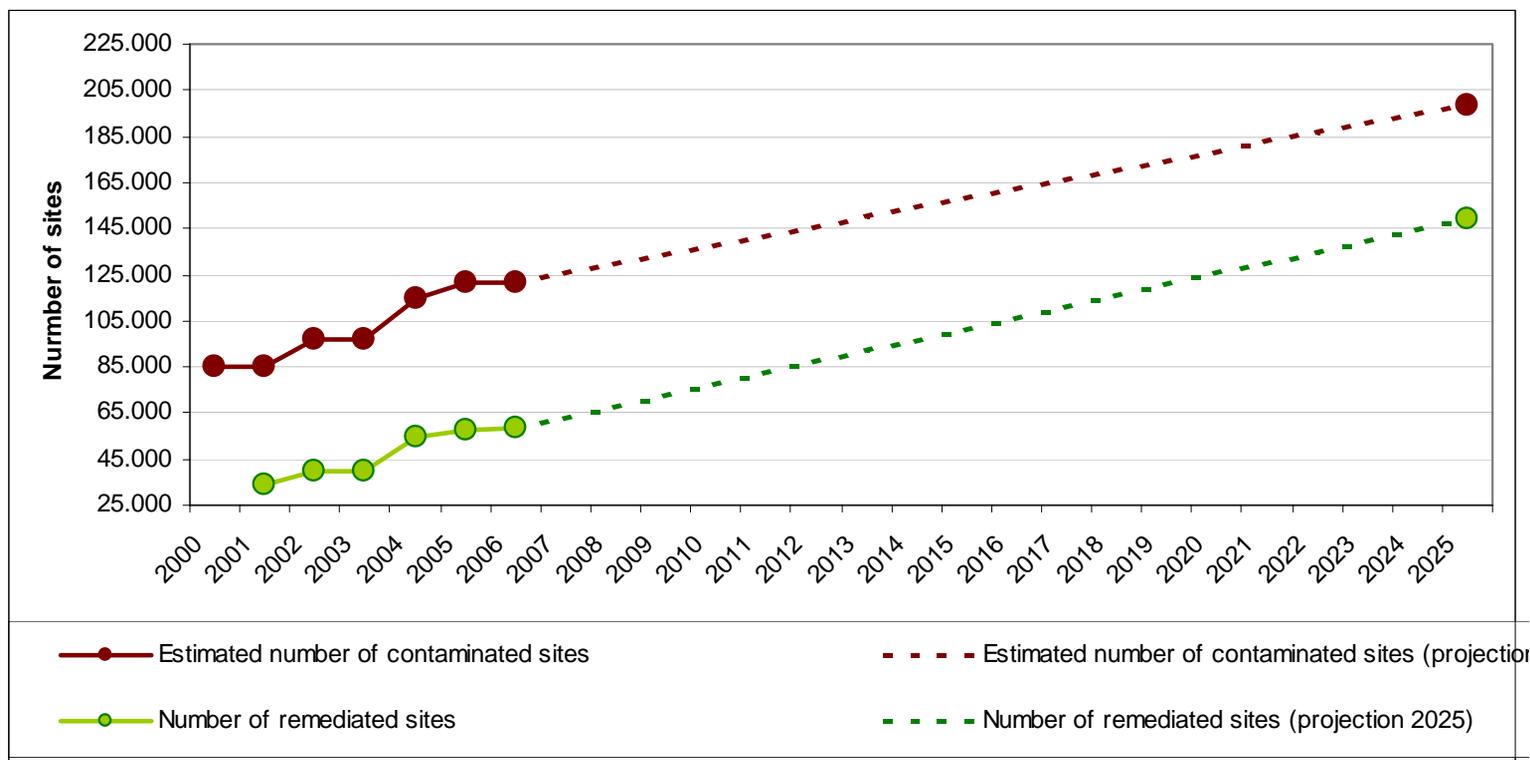
3. Current status

Applied remediation technologies for risk reduction of contaminated soil



3. Current status

Status of completion of remediations in contaminated sites in Europe



Data coverage: Austria, Belgium (only Flanders and Brussels Region), Bulgaria, Croatia, Czech Rep., Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Lithuania, Luxembourg, Netherlands, Norway, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland.

Data coverage: 2001-2005. Projection to 2025.

Data source: EIONET priority data flows 2001-2006.

3. Current status

Time-specific targets as established in national legislation, agreements or programmes

Country	Year	Target (Political or technical level)
Austria	2050	Remediation and re-integration of identified contaminated sites into the economic and natural cycle.
Belgium (Flanders)	2007	Environmental policy plan 2003-2007: Remediation of historical contamination which needs more urgent action.
Croatia	2008	Remediation of all 187 official landfills and about 3000 illegal dump sites.
Czech Republic	2040 2010	Remediation of uranium and coal facilities DIAMO. Remediation of sites heavily contaminated by POPs.
Netherlands	2030	Complete the investigation of all historical sites. Complete the necessary remediations or at least keep contamination under control. Government support to remediation was discontinued.
Norway	2005	Solve environmental problems on sites with contaminated soil where investigation and remediation are required. Clarification of environmental state on sites where further investigation is needed by 2005. The target was fulfilled.
Romania	2020	Environmental remediation of the majority of contaminated areas.
Serbia	2006-2015	Rehabilitation of landfills which pose the greatest risk for the environment. Remediation of contaminated soils in industrial complexes. Remediation and recultivation of areas degraded by mining activities. Rehabilitation of ash disposal sites (energy sector).
Slovakia	2015	Remediation of the contaminated sites posing the highest risk to human health and the environment (ensure that water quality reach the "good status of water" established in the Water Framework Directive).
Slovakia	2050	Remediation of all sites (depending on economical and technical development).
Sweden	2050	Fifteen environmental quality objectives for different areas were adopted by the Swedish Parliament in 1999.
United Kingdom	2007	Remediate and/or investigate 80 Special Sites identified under the Part IIA Regime (Environmental Protection Act 1990) in England and Wales.