

Soil Remediation and Land Management – a Win-Win Situation

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Situation in European Member States

European Country	Potentailly contaminated sites	Contaminated sites	References
Austria	58,000 – identified 80,000 – estimated	2,500 – identified 10,000 – estimated	Kasamas, Common Forum 2010
Belgium / Flanders		30,660 – identified	Van Dyck, 2011
France	245,000 – identified (past) 300,000 – estimated (past) 548,000 – identified (operation)	4,596 – identified	BASIAS & BASOL databases, 2011
The Netherlands	1,700,000 – estimated	2,500 – identified 56,000 – estimated	Harmsma, 2010
United Kingdom / England & Wales	325,000 – estimated	33,500 – estimated	England & Wales Environment Agency 2005

Situation in Germany

- a) 314,000 suspected sites (abandoned sites only)
26,000 sites just remediated

but:

- b) 1.4 Mio. sites still in operation (industry,
trade, energy, mining, military...)
30 % with contaminations?

The Problem

Contaminations:

- Increasing number of derelict sites in Germany and Europe
- 250 years of industrial heritage
- Soil, groundwater and surface water contamination at nearly each of these sites
- 250,000 hectares = 2.5 billion m² lie fallow in the cities of Germany effected by structural change of the economy and industrial and public sectors as:
 - mining, gas and steel production
 - infrastructure (railways, airports...)
 - military sites



The Problem

⇒ Greenfield Consumption in Germany

- 850,000 m² per day
- Demands on biodiversity and ecological functions of soil
- Increases suburbanization process
- Leaves „real problems“ where they are
- Hinders sustainable urban development

Solutions

⇒ Circular Land use Management

- Brownfield redevelopment as part of the (national) strategie of sustainability (300,000 m² per day in 2020)
- Remediation as basis and initial spark for redevelopment
- Sucession into nature (sites which are unsuitable for reuse)
- Instruments:
 - urban planning
 - soil and land information systems

Solutions

- communication and participation
- financial management for local authorities
- business plans for cities and their development
- funding
- regional acting
- compensation of taxes between communities
- management strategies

Soil and groundwater contaminations

- Often a high risk to be dealt with! Quality of risk assessment?
 - The time needed for remediation blocks development.
 - Brownfield redevelopment supports remediation of contaminants!
-  Win-win situation for the problem owner, the local authorities and citizens.

Objective and process – Remedial investigation

The objective is to choose scenarios for remediation optimal under the ecological and economic conditions. A remediation scenario may be composed of various remediation methods.

As a result of the hazard assessment (preliminary) remediation objectives should be also defined. These may be:

- a maximally admissible harmful substances concentration;
- a maximally admissible load of harmful substances (quantity); or
- a reduction of the contamination by harmful substances by a certain percentage (e.g. 90%).

Project preparation

The preparation of the project includes the following working steps:

- Determination of the participants and their competences (authorities, experts, contracting party);
- Clarifying the particular tasks of the responsible parties (often, an enterprise may set off the remediation expenses against tax and for this reason is interested to take over a part of the work);
- Securing of financing;
- Choosing and employing an expert + determination of the form of the reports to be presented.

Optional activities

If necessary, the following activities should be undertaken during the remediation investigation:

- additional site investigations (e.g. of soil and groundwater);
- partitioning the total area into various remediation zones, to be remediated according to different methods (e.g. separation of landfills and industrial sites);
- preliminary test to state the suitability for remediation (e.g. soil air extraction).

The costs of each remediation scenario must be estimated. The scenarios should be divided into individual measures so that a comparability and feasibility are guaranteed.

The following subdivision is suitable for this purpose:

- Core activities (e.g. application of a surface cover);
- Preliminary activities (e.g. planning activities);
- Constructing and other activities accompanying the technology (e.g. fences, intermediate stores, site facilities, emission reduction measures);
- aftercare activities (e.g. monitoring).

Basis for a successful site development

- Finalized town-planning
- Market analysis (need of areas)
- Comprehensive knowledge about risks at the site
 - contaminations
 - hazardous waste
 - munition (world war II)
 - rest of buildings (pipes, fundaments, tanks)
- Costs for remediation and removal of the buildings
- Costs for inner opening
- Costs for financing

Remediation Costs - Germany

- 500 Mio €/a public money, spent mainly for site investigation and orphan sites
- 2.5 Billion € (past 20 years; large scale projects new „Länder“)
- 9 Billion € (past 20 years lignite remediation program)
- 6.2 Billion € (past 20 years until 2015 uranium mining program)