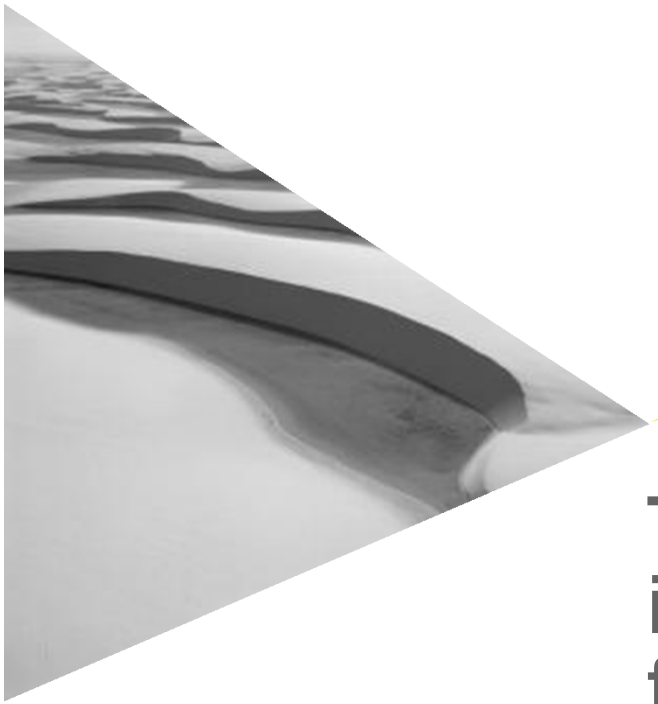

The soil remediation industry in Europe: the recent past and future perspectives

Julien Perez

May 10, 2012

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Content

- Context of the soil remediation in Member States
- Overview of the regulatory context
- Situation of soil remediation market


Context

Soil contamination, an important issue across EU

- **3.5 million sites in the European Union (EU)** were estimated to be potentially contaminated with 0.5 million sites being really contaminated and needing remediation

- Soil is a **non renewable source**

- Actions need to be undertaken at all levels:
  - **Local level**: soil as a key source of socio economic development, sharpest knowledge of soil contamination context, local authorities to implement and follow application of regulations
  - **National level**: broadcast best practices, invest in research and knowledge, provide guidance and target, enact national regulation
  - **European levels**: broadcast best practices, provide guidance and target, manage trans boundary impacts

Objective and methodology of the assignment

- The objective of the assignment is to get **a global picture of the sector of soil remediation across Member States,** including**:**
  - **Regulatory context**: regulation in force, regulatory authority, allocated public finance
  - **Maturity of the market**: methodological tools and guidelines, inventory, public/private players, drivers/barriers
  - **Market analysis**: jobs, turnover, public/private expenditure
- The current presentation details **preliminary results**
- **Methodology:**
  - **Interview with 7 international representatives**
  - In-depth **bibliographic research**
  - **Interview local representatives** (441 contacted, 150 successful contacts, 47 questionnaires collected, 36 interviews performed)

Regulatory context

Overview of the general regulatory context

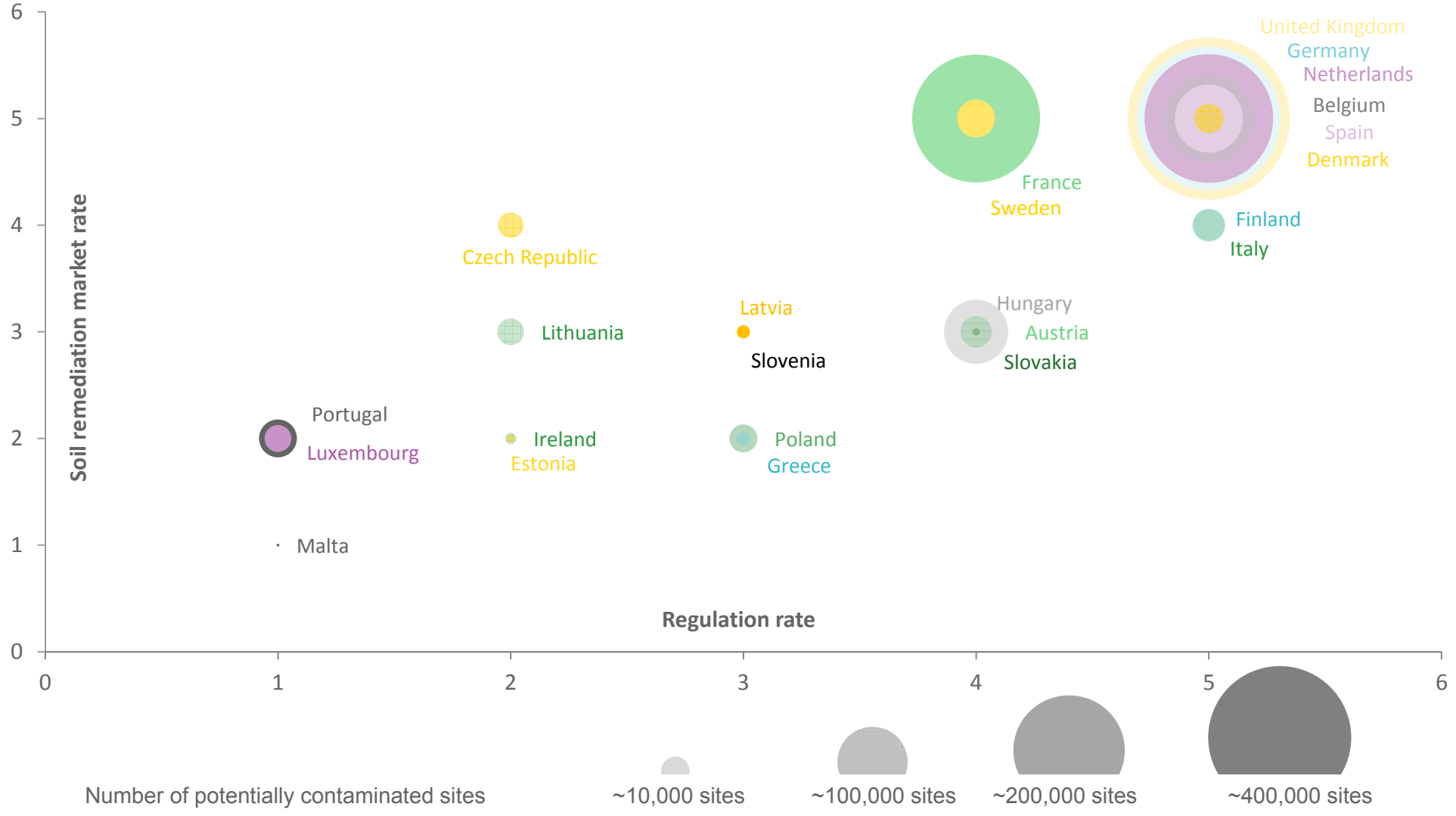
Country	Regulation maturity	Level of regulation	Type of methodology
Austria	Waste and industrial regulation	National level	Risk assessment
Belgium	Specific soil regulation	Regional level	Risk assessment
Bulgaria	Waste and industrial regulation	National level	Risk assessment
Cyprus	General environmental law	National level	Thresholds approaches
Czech Republic	General environmental law	National level	Risk assessment
Danemark	Specific soil regulation	National level	Risk assessment
Estonia	General environmental law	National level	Thresholds/land use
Finland	Specific soil regulation	National level	Risk assessment
France	Waste and industrial regulation	National level	Risk assessment
Germany	Specific soil regulation	National level/local implementation	Risk assessment
Greece	Waste regulation	National level	No official methodology
Hungary	Specific soil regulation	National level	Risk assessment
Ireland	General environmental law	National level	Risk assessment
Italy	Specific soil regulation	National level/local implementation	Risk assessment
Latvia	General environmental law	National level	Thresholds approaches
Lithuania	General environmental law	National level	Risk assessment
Luxembourg	Waste regulation	National level	Thresholds approaches
Malta	Waste regulation	National level	No official methodology
Netherlands	Specific soil regulation	National level	Risk assessment
Poland	General environmental law	National level	Thresholds approaches
Portugal	General environmental law	National level	No official methodology
Romania	Specific soil regulation	National level	Thresholds approaches
Slovakia	General environmental law	National level	Risk assessment
Slovenia	Environmental law covering partially soil	National level	Thresholds approaches
Spain	Specific soil regulation	National level/local implementation	Risk assessment
Sweden	General environmental law	National level	Thresholds/Risk assessment
UK	Specific soil regulation	Regional level	Risk assessment

Evaluation of countries situation

	Regulation in force	Public and/or private organizations	Allocated financial tools	Methodological and technical tools	Inventories	National remediation industry private share of remediation country's expenditure
Austria	4	3	3	4	5	3	10 %
Belgium	5	5	4	4	5	5	60 %
Bulgaria	3	2	3	2	1	1	10 %
Cyprus	1	2	1	2	3	1	0 %
Czech Republic	2	4	4	3	3	3	25 %
Denmark	5	5	5	5	5	4	40 %
Estonia	2	1	2	1	3	2	25 %
Finland	5	5	4	4	5	4	70 %
France	4	5	4	5	4	5	80 %
Germany	5	5	4	5	5	5	50 %
Greece	3	2	4	2	3	1	10 %
Hungary	4	2	2	3	4	4	25 %
Ireland	2	2	2	2	2	3	75 %
Italy	5	4	4	5	4	4	80 %
Latvia	3	3	3	3	4	3	10 %
Lithuania	2	2	4	3	3	3	20 %
Luxembourg	1	1	1	2	3	2	0 %
Malta	1	1	2	1	2	1	10 %
Netherland	5	5	5	5	5	5	55 %
Poland	3	2	4	1	2	2	10 %
Portugal	1	2	3	1	1	3	70 %
Romania	4	3	2	2	3	2	80 %
Slovakia	4	3	3	2	4	3	80 %
Slovenia	3	2	3	2	2	3	10 %
Spain	5	5	3	5	3	5	60 %
Sweden	4	4	5	5	5	4	60 %
UK	5	5	4	5	2	5	70 %

GROUP	COUNTRIES
Group A	Belgium, Denmark, Germany, Netherlands
Group B	Austria, Finland, France, Italy, Spain, Sweden, Hungary, United Kingdom
Group C	Bulgaria, Czech Republic, Estonia, Greece, Latvia, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia
Group D	Cyprus, Luxembourg, Malta, Ireland

Mapping of country



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Remediation turnover evolution

Absence of specific regulation
No or limited remediation market

Development of the regulation
Outbreak of national companies
Market captures by international companies

Regulation in place
Structured and active national and international players

Remediation turnover

Estonia
Cyprus
Malta
Portugal
Luxembourg

Lithuania
Czech Republic

Ireland
Estonia

Latvia
Slovenia

Poland
Greece
Bulgaria
Romania
Slovakia

Austria
Finland
Sweden
Spain

France
UK
Italy

Netherland
Belgium
Germany
Denmark

Total expenditures dedicated to soil remediation
Private expenditures dedicated to soil remediation
Public expenditures dedicated to soil remediation
Expected effect of regulation enforcement

Time

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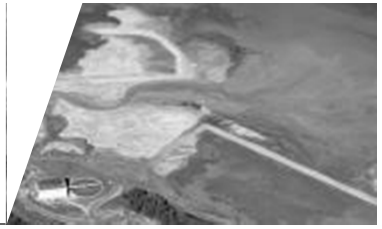
Situation of soil remediation market

Number of contaminated and potentially contaminated sites



		Austria	Belgium	Bulgaria	Cyprus	Czech Rep.	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland
Total country area (km^2)		83858	30528	110879	9250	78870	43100	45227	338144	675417	357022	131960	93028	70273
Estimated max number of potentially contaminated sites (EIONET)		30000	-	1837	-	>11000	55000	-	25000	950000	-	3000	30000	2500
Estimated max area of current potentially contaminating industry (km^2)		3355	1831	3327	-	2366	1724	1357	6763	9881	17851	3958	2791	4217
Identified number of potentially contaminated sites		2144	118000	-	-	10000	13400	892	16800	251000	314347	3036	15000	2000
Identified area potentially contaminated (km^2)	Min	48	350	8449	-	200	268	18	336	5020	6287	61	300	40
	Max				-	2100	2814	187	3528	52710	66013	638	3150	420
Identified number of contaminated sites		148	12283	8	-	4367	14072	300	1850	4478	14209	-	742	150
Identified area of contaminated sites identified (km^2)	Min	14	180	318	-	87	281	6	37	90	284	-	15	3
	Max				-	917	2955	63	389	940	2984	-	156	32

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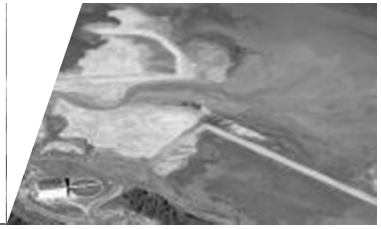
Number of contaminated and potentially contaminated sites



		Italy	Latvia	Lituania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	UK
Total country area (km^2)		301263	64189	65300	2600	316	41543	312685	92200	238391	49033	20255	505911	441369	242900
Estimated max number of potentially contaminated sites (EIONET)		100000	2600	15000	12000	300	615000	-	-	40000	30000	2000	-	80000	-
Estimated max area of current potentially contaminating industry (km^2)		15061	1292	1304	155	-	4983	9381	3682	7125	977	609	15167	826	7345
Identified number of potentially contaminated sites		15000	2654	11000	11000	117	254000	12000	22000	552000	850	5	71202	22000	403606
Identified area potentially contaminated (km^2)	Min	300	53	220	220	2	5080	85000	440	11040	17	0	1424	125	4044
	Max	3150	557	2310	2310	25	53340		4620	115920	179	1	14952		
Identified number of contaminated sites		12638	243	2200	1000	8	11000	-	-	1865	200	5	210	1500	794
Identified area of contaminated sites identified (km^2)	Min	2498	5	470	20	0	220	11000	-	3500	4	0	4	2	16
	Max		51		210	2	2310		-		42	1	44		167

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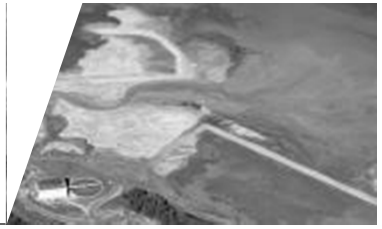
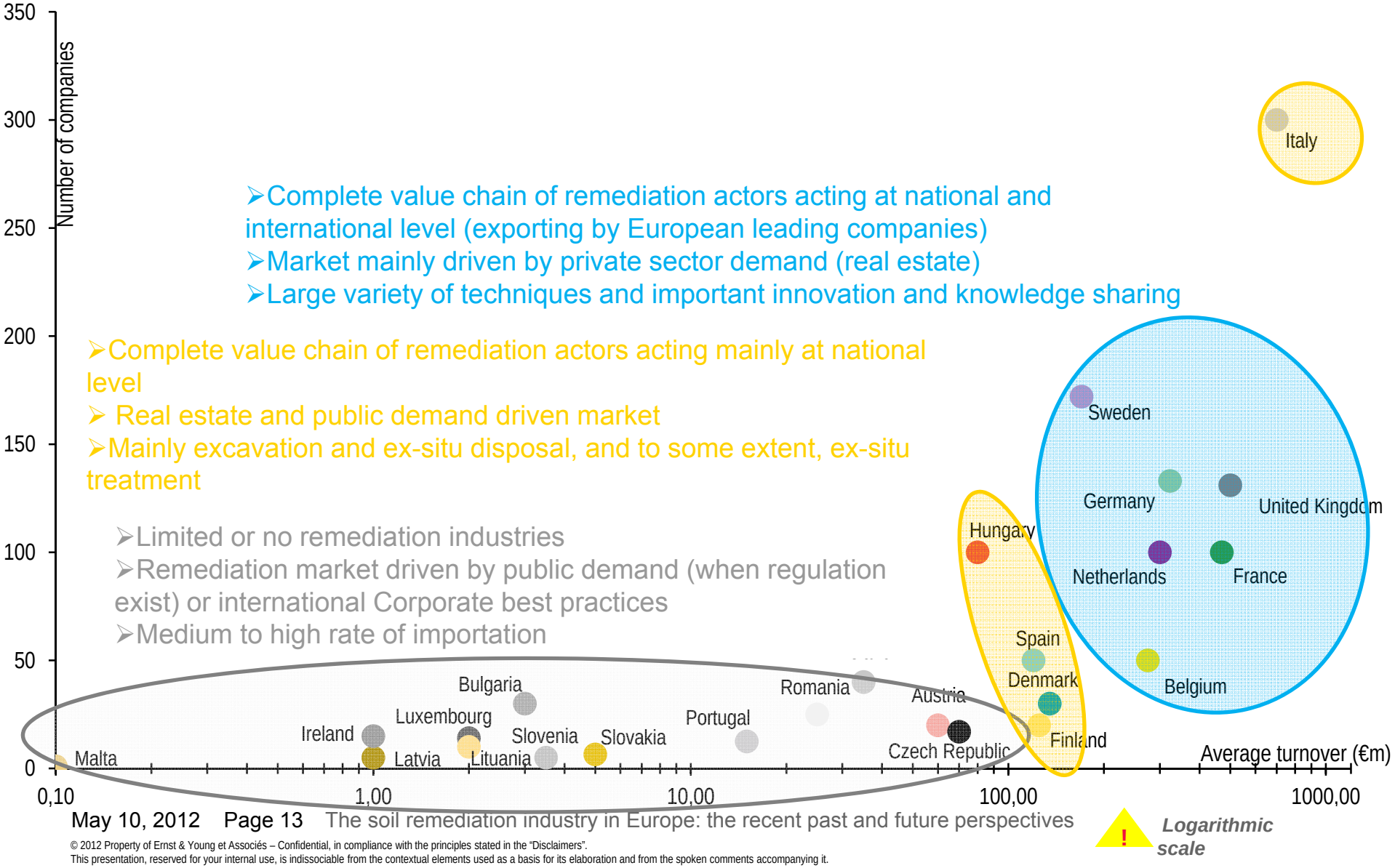
Soil remediation market

Analysis of remediation market dynamism (turnover x nbr of companies)





➢Complete value chain of remediation actors acting at national and international level (exporting by European leading companies)
➢Market mainly driven by private sector demand (real estate)
➢Large variety of techniques and important innovation and knowledge sharing

➢Complete value chain of remediation actors acting mainly at national level
➢ Real estate and public demand driven market
➢Mainly excavation and ex-situ disposal, and to some extent, ex-situ treatment

➢Limited or no remediation industries
➢Remediation market driven by public demand (when regulation exist) or international Corporate best practices
➢Medium to high rate of importation

Back-up slides - Methodology

Synthesis of contact

Country	Nbr of attempted contacts	Nbr of successful contacts	Nbr of questionnaires	Nbr of interviews performed
Austria	6	3	3	1
Belgium	24	7	0	5
Bulgaria	14	8	1	1
Cyprus	5	1	0	0
Czech Republic	30	13	6	1
Denmark	6	4	1	1
Estonia	35	4	1	0
Finland	16	6	4	0
France	16	8	0	3
Germany	35	6	1	2
Greece	10	6	2	1
Hungary	11	3	0	2
Ireland	15	7	0	6
Italy	19	9	1	1
Latvia	10	5	1	0
Lithuania	10	2	2	0
Luxemburg	7	3	0	3
Malta	8	5	2	0
Netherlands	17	3	2	1
Poland	7	2	0	1
Portugal	6	3	2	2
Romania	9	3	1	1
Spain	33	13	13	1
Slovakia	19	14	2	0
Slovenia	24	7	2	1
Sweden	32	1	0	0
United Kingdom	17	4	0	2
Total	441	150	47	36
EU level	-	-	-	7

Synthesis of contact

Country		Number of interviews performed
Austria	1	Thomas Reichenauer - AIT
Belgium	5	Johan Ceenaeme – OVAM / Jean-Pierre Janssens – IBGE / Pol Jacquemart – SPAQUE / Geert Ide – ENVISAN / Marnix de Smet - SITA BELGIUM
Bulgaria	1	Borislava Borisova, Veneta Vasilevan & Irena Ivanova -
Czech Republic	1	Richard Pribyl - MINISTRY OF ENVIRONMENT
Denmark	1	Christian Andersen - INFORMATION CENTER OF CONTAMINATED SITES
France	3	Jean-Luc Perrin - MINISTRY OF ENVIRONMENT / Philippe Bodenez - MINISTRY OF ENVIRONMENT / Christel de la Hougue - UPDS
Germany	2	Andreas Bieber - COMMON FORUM
Greece	1	Mr. Mahairas Ioannis - MINISTRY OF ENVIRONMENT / Mrs Boura Foteini - DEPARTMENT OF ENVIRONMENTAL PLANNING / Mrs Stouraiti Christina - DEPARTMENT OF SOLID WASTE MANAGEMENT
Hungary	2	Peter Temesvary - ERM HUNGARIA (covers also ROMANIA) / Gabor Hasznos - MINISTRY OF RURAL DEVELOPMENT
Ireland	6	David Smith – ENVIRONMENTAL PROTECTION AGENCY / Paul Chadwick – RPS / Garreth Kelly – ENVA / Kevin Cleary – VERDE / Colin Lennon – RIALTA / Jonathan Moore – FORDE CONSULTING
Italy	1	Mario Carere - ISTITUTO SUPERIORE DI SANITA
Luxemburg	3	Sophie Capus - ENVIRONMENTAL ADMINISTRATION AEV / Eric De Brabanter - STATISTICAL INSTITUTE STATEC / Marc Heicher - ENVIRO SERVICES INTERNATIONAL SARL & FORSED PRESIDENT
Netherlands	1	Ton Honders - NL AGENCY
Poland	1	Peter Reich – URS / Matthias Schröder - ERM
Portugal	2	Jorge Candeias - GOLDER ASSOCIATES PORTUGAL UNIPESSOAL / Teresa Tavares - AGENCIA PORTUGUESA DO AMBIANTE
Romania	1	Ion Florescu & Simona Toma - INSSE NATIONAL INSTITUTE OF STATISTICS
Spain	1	Begona Fabrellas - MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE
Slovenia	1	Mike Worm - MUEG
United Kingdom	2	Nicola Harries - CL:AIRE / Morwenna Carrington - DEFRA / ENVIRONMENTAL AGENCY
Total	36	
EU level	7	Florent Devaux – EUROFINS / Christian Jabbour – ERM / Rony Annaert – ERM / Luca Fagiuoli – ALCONTROL / Richard Modolo - ARCADIS France / Dominique Darmendrail - BRGM / COMMON FORUM / Sandrine Magdaliniuk & Audrey De La Porte Du Theil - AREVA

Limitations

- Some difficulties were encountered during the data collection
- Bibliographic review:
  - Unavailable information on website or publication
  - Partial data or too aggregated data to enable an in-depth evaluation
  - Low level of reliability of data
  - Few recent data
  - Heterogeneous data between countries (contaminated site definition, contaminated surface calculation, scope of public or private expenditures, etc.)
- Email contacts
  - Emails which remains unanswered despite our reminders
  - Lack of precision in the data provided
- Interviews:
  - Phone calls which remains unanswered
  - Remediation companies reluctant to provide confidential data (despite the confidentiality agreement)
- Questionnaires:
  - Incomplete questionnaires
  - Questionnaires which remains unanswered

Limitations

- To harmonize the parameter of data collected, a common list of definition has been set up (extract)

Terminology	Definition	Observed limits
Site	Any property, plant, building, structure located on one or more contiguous or adjacent properties, in actual physical contact or separated solely by a public roadway or other public right-of way. A site can be identified by an address.	-differences in the notion of "site" according to countries (piece of land, land owned…) -sites' surface can vary a lot from a country to another and does not allow to make coherence test
Contaminated site	Site with confirmed presence of "dangerous substances" caused by man in such a level that they may pose a risk to a receptor (human or environment), taking into account land use. Nuclear contamination and agriculture contamination are excluded of the scope.	- differences between countries on the threshold value from which a risk to a receptor can be considered (standard guideline value? risk-based) - the diversity of quality and extensiveness of investigation conducted from site to another impact the categorization of a site as contaminated or not
Potentially contaminated site	Site where soil contamination is suspected but not verified and detailed investigations need to be carried out to verify whether relevant impacts exist. Generally speaking, potentially contaminated sites are, in most of the case, encountered at former industrial, waste disposal or military sites.	- successive historical activities on a same piece of land are double counted by some countries - when it exists, the exhaustiveness of existing national or regional database is unclear and generally not reached -the list of concerned activities can differ from a country to another
Contaminated/potentially contaminated site area	Surface area of contaminated or potentially contaminated soil (km^2). When spot contamination was present, the whole size of the site is to be considered	- limited access to this information since it is not collected in most of the member states
Soil remediation	Action of reducing the risk to human health or to the environment of a soil by treating the source of the contamination (removing, treatment, containment, elimination, attenuation…). Soil remediation supposes the application of techniques that can be in-situ, on-site or ex-situ.	- Inherent difficulties to definition of contaminated sites (see above)

Limitations

Terminology	Definition	Observed limits
National remediation industry turnover	Total revenue of companies involved on the national remediation industry. Only the revenue related to soil investigation and remediation is included.	-data not always available -companies provided their total turnover but it does not only cover their remediation activities
Direct employment	Number of employees in companies involved in the national remediation industry, in full-time equivalent. Only personnel working on remediation projects/topics have to be counted (ie. in a consultancy company only people related to the soil division have to be counted).	-data not always available -companies provided their total number of employees and only the soil remediation related one.
Indirect employment	Number of indirect employees of the soil remediation sector. It includes providers but also subcontractors (ie laboratories, technology providers, transporters, drillers) This data shall be estimated on the basis of bibliographical reviews.	-data not available - difficult to estimate as in a same company direct and indirect job can be identified
Private expenditures	Expenditures allocated to investigation, remediation and after-care measures by private parties. Private funding mechanisms (such industry association fund) are included.	-often not known -sometimes only amount of expenditures from funding mechanisms are available
Public expenditures	Expenditures allocated to investigation, remediation and after-care measures by public parties. National and international funds are considered as public money and are included in the public expenditures. Research activities and redevelopment expenditures are excluded. Data collected or estimated cover the 2000 – 2010 period and, when possible, national and European fund were distinguished	-actors are not always able to provide the exact perimeter of the data -overall data not always available -sometimes only amount of expenditures from funding mechanisms are available
Management cost	Costs bared by public bodies and related to contaminated soil management. They include: - inventory process (for both potentially contaminated and contaminated sites) - management of potentially contaminated sites It includes both administrative costs (staff and overhead costs) and costs of compliance with the national legislation. Cost defined as “Public expenditures” are excluded.	-this data is generally not known

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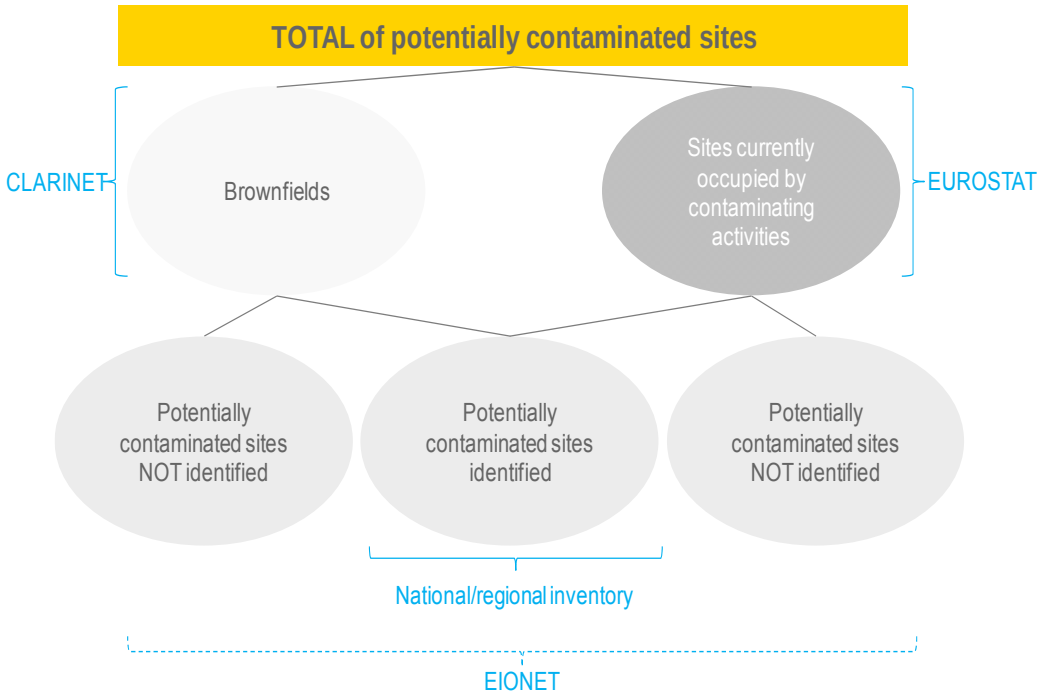
Estimation methodology

- Following methodologies was applied to estimate missing data

- Contaminated or potentially contaminated sites



- Other indicators (such as expenditures, turnover, employment):
  - Expert estimate
  - Use of data from EIONET / EUROSTAT depending on indicator
  - Ernst & Young estimate based on coherence ratios (reasonable hypothesis), e.g.:
    - *Surface: ratio on countries*
    - *Expenditures: extrapolating average on a time period, extrapolation on similar countries (% public / private expenditures)*

Whatever the source of data is, coherence ratios have been conducted

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Questions & answers

Please feel free to use our contact details below to send us your comments and inputs

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