REMTECH2013

Tools and practices for Sustainable Remediation, do we make a difference: a regulators view

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What's it about!

- Tools & practices – Austria (examples)
- Review of Sustainability assessment tools (source: ADVOCATE & VITO)
- Preparing more sustainable solutions (e.g. Flanders & Austria)

- Green? eco-efficient? risk-informed? Sustainable!?

Risk and Sustainability

What's common? What's different?

	Risk	Sustainability
origin / use	economy / science	ecology / policy
based on …	a mental construct	an ethical construct
objective	transparency	fairness
Important	• single target • accountability • effectiveness	• multi-objective • interdependency • efficiency
question	Should we act?	How can we act?
support to …	better decisions	better action
strategy	prevent or limit	synergy

Austria s „new“ MCEA-Tool (1)
Integrating sustainability

- **WHY: Federal funding guidelines: "Maximum ecological effect under acceptable cost"**
- **HOW: MCEA-Tool – use is obligatory (since 1.01.2012)**
  - ☺ **Established, commonly used, simple, flexible (CEA = basis for many different applications)**
  - ☺ **Clear definition of priorities / hierarchy of goals**
  - ☺ **costs are a separate parameter (contrary to MCA)**
  - ☺ **High transparency!**

Austria s „new“ MCEA-Tool (2)

Algorithms MCEA (main principle)

				Alternative A		Alternative B		Alternative C	
Level 1	Weight	Level 2	Weight	Effectiveness 0-10	Effectiveness x Weight	Effectiveness 0-10	Effectiveness x Weight	Effectiveness 0-10	Effectiveness x Weight
Ecology	50	G11	25	3	75	4	100	8	200
		G12	15	6	90	7	105	10	150
		G13	10	9	90	0	0	5	50
Local develop-ment	30	G21	15	1	15	1	15	7	105
		G22	10	0	0	10	100	10	100
		G23	5	7	35	7	35	3	15
Project stability	20	G31	10	5	50	8	80	6	60
		G32	6	4	24	3	18	9	54
		G33	4	4	16	6	24	4	16
Total	100		100	Total-effectiveness	395		477		750
		Cost	Mio.		19,2		9,5		13,3
Effectiveness/Cost-Ratio			E/C		20,6		50,2		56,4
			Rank		3		2		1

Austria s „new“ MCEA-Tool (3)
„Goal 1“ at Level 1: Ecology

Level 1	Weight	Level 2	Weight	Level 3	Weight
Ecology	60	Primary ecological effects (“goal of remediation”)	40	Effect on source of pollution	20
				Effect on threatened subject (e.g. groundwater)	15
				Period until effect	5
		Secondary ecological effects (“side effects”)	20	Other subjects of protection	4
				Climate protection	4
				Energy	4
				Waste	4
				Natural resources	2
				Local ecosystem	2

Level 4: Criteria

Austria s „new“ MCEA-Tool (4)
EXPERIENCES so far

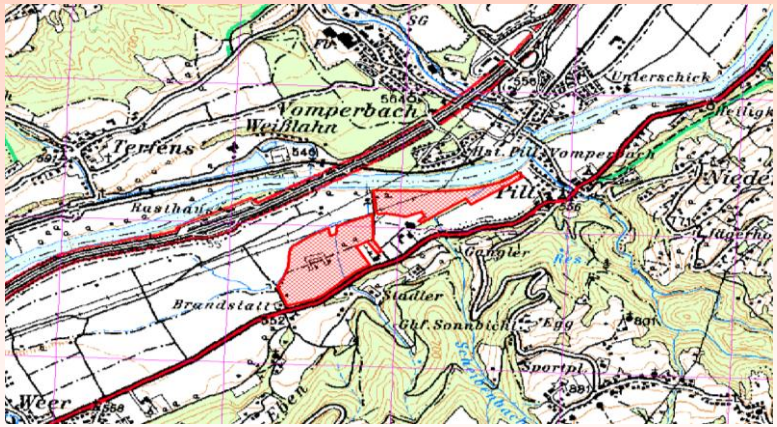
- prescriptive, allows for some site-specific adjustment
- not advocating a participatory approach at site level
- social dimension the weakest pillar
- experiences within the national funding still limited
- costs and the established “remediation market” stay a dominating factor
- a few projects will be different (“1 out of 4”?)
- adaptations for option appraisals outside the national funding programme indicate reasonable differences

Case study – Austria

"LANDFILL PILL" (1)

- **Operating time: 1973 - 1990**
- **Size: 310.000 m² / ~ 1 Mio. m³**
- **pretreated domestic waste**
- **mixed industrial waste**

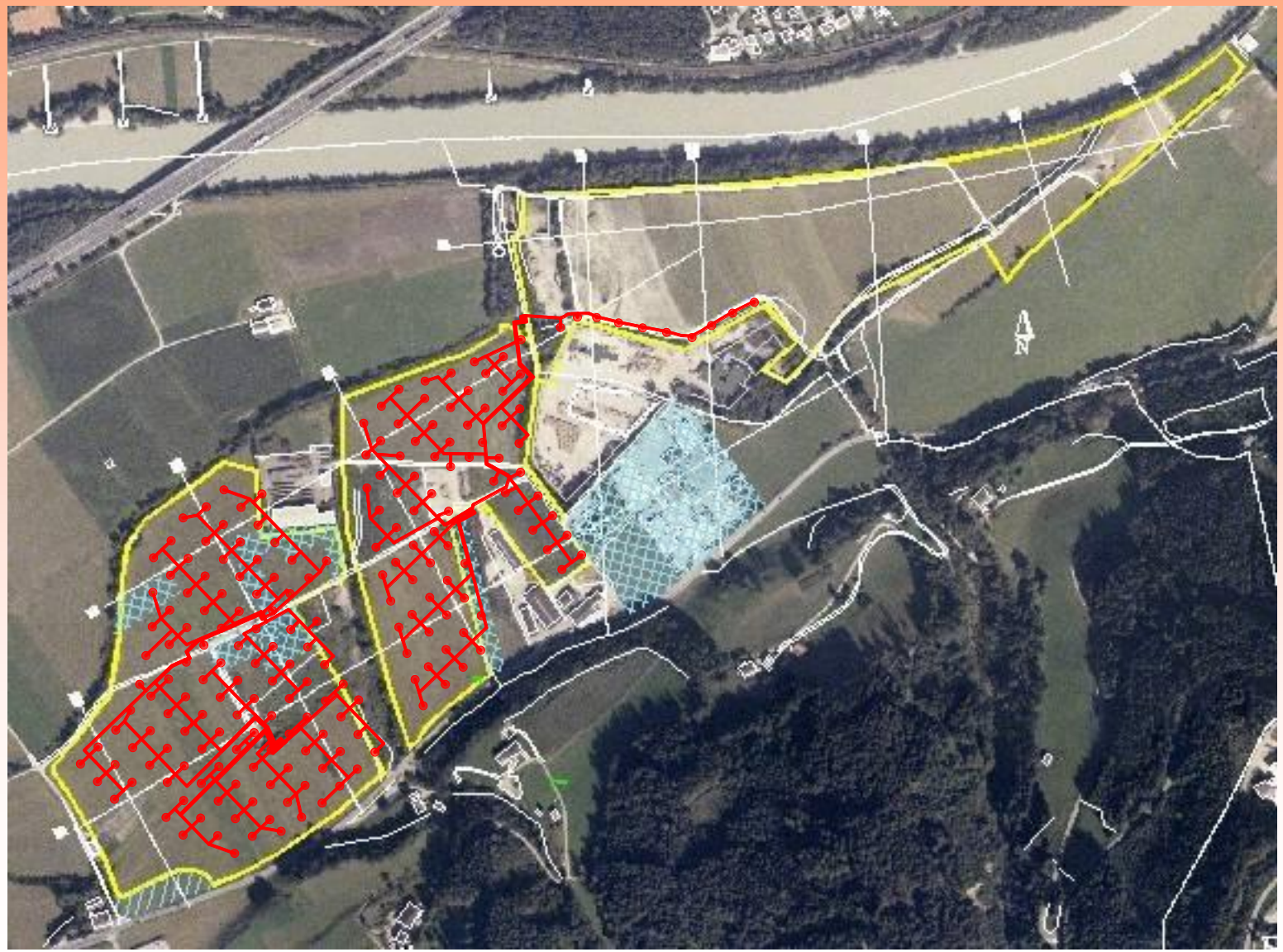
➔ **clean-up (dig & dump): 50 M€**



<u>Remediation alternative:</u>

- **investigation (2004)**
- **capping (east)**
- **monitoring (south)**
- **aeration (west, 2010)**

“LANDFILL *PILL*” (2)
AERATION SYSTEM



Case study – Austria
"LANDFILL PILL" (3)

- ✓ **Remediation objective: good groundwater quality**
- ✓ waste and traffic minimised (> 50.000 trucks)
- ✓ CO2-savings (as well CH4)
- ☹ nitrogen-balance? (N2O – GWP: 310!!!)
- total energy saving: > 50 %
- cost savings: > 50 %

➔ **"Factor-4"-project**

Personal remarks:

- ***It's a claim, which is likely , but: WE DON'T DEMONSTRATE (holistic data gathering and reporting is missing)***
- ***site-specifically time is not a critical factor!***

SustRem 2012 (Vienna)
Case studies

PERSONAL OBSERVATIONS

- a lot of projects at the design or pilot phase
- Greening remediation gets to the field
- sustainability claims for technologies (!?)
- data gathering on environmental and social impacts during implementation is generally poor/missing
  - **We need to move from claims to projects demonstrating benefits transparently!!**
- NL and UK starting to make a difference

Sustainability Assessment Tool Review

Objective:

- **Evaluate the consideration of social impacts in current tools (DSSs)**

Method:

- **2 Stage** evaluation:
  1. evaluate how social impacts are considered
  2. apply tools to case study

Source:

- **Beames, A. (2012) "Accounting for Social Aspects in Sustainable Brownfield Revitalization"** (2nd International Conference on Sustainable Remediation; Vienna (AT), November 2012

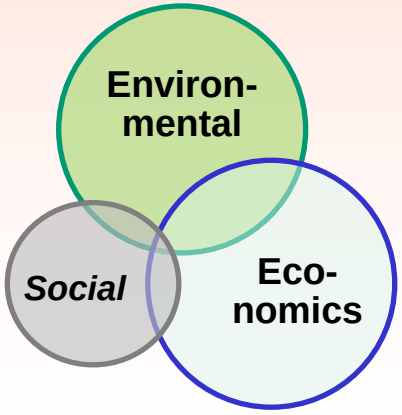
Previous Reviews of Sustainability DSSs

CONCLUSIONS:

Most tools consider:

- **Environmental Quality and Resource Use**
- **Costs associated with remediation alternatives**

"social impacts" less thoroughly considered



Review Stage 1: Social Impacts Included

SRT:

(During remediation)

- Injury risk for workers
- Local emissions

REC:

(Post remediation)

- Reduction in contamination risk
- Space made available

GoldSET:

(During remediation)

- Injury risk for workers
- Community impacts
- Duration of public disruption

(Post remediation)

- Soil vapor intrusion
- Public space created
- Improvement in potable water supply
- Opportunities for Local business generation
- Preservation of culturally valuable buildings and structures
- Impact on the landscape

SuRF-UK:

(During remediation)

- Reduction in contamination risk
- Worker safety
- Public and neighbors safety
- Effects from dust, light, noise, odor and vibrations traffic

(Post remediation)

- Changes in site usage by local communities
- Changes in the built environment

(Other)

- Ethics & Equality
- Communities & Community Involvement
- Uncertainty & Evidence

Case study Stage 2: Remediation Alternatives

Research Question:

How do the results of available tools differ when applied to the same brownfield revitalization case study?

Case Study:

Petroleum Zuid, Antwerp

- **Mineral oil** contamination of soil and groundwater with the formation of **LNAPL** zones

Alternative 1:

Limited Excavation of all mineral oils LNAPLs and heavily contaminated soil > **20 000 mg/kg concentrations (soil treated on-site)**

Alternative 2:

Excavation of all contaminated soil (soil treated on-site)

Alternative 3:

***In situ* thermal desorption (conductive heating)**

Alternative 4:

Monitored Natural Attenuation

http://www.wrscompass.com/services/remedial-construction/remediation-grading-and-excavation.aspx

http://www.niras.com/Business-Areas/Environment/References/Contaminated-soil-and-ground-water/Remediation/In-Situ-Thermal-Remediation-of-DNAPL-using-the-ISTD-method.aspx

Sustainability Assessment Tool Review
CONCLUSIONS

- Assessment methods that more closely reflect what is proposed by remediation forums (SuRF-UK), yield different results to methods that only include standard criteria
- *In situ* technologies perform better in sustainability assessments when the social considerations are broadened

Final thought/question (Beames, A., Vienna 2012):

Is the difference in the cost of projects offset by the improvement of environmental & social impacts?

30 years OVAM – Workshop Green Remediation
Panel discussion - Results

- **BATNEEC and MCA are not “green” enough ?**
  - More focus on regional/global and long term effects
  - BAT**NEEC:** not enough new developments or green features
- **Green soil remediation does not go without adjust remediation objectives, sometimes less is more ?**
  - Focus both on green and sustainable remediation
  - More attention to real risks, sustainable management of contamination, residual contamination and potential liabilities, aftercare (value to society), etc.
- **Green remediation as guidance principle is too loose, it should be enforced in law and standard procedures ?**
  - Yes: 75% wouldn't have remediated if not enforced by law (survey)
  - No: image and mission statement of company can be driving force

Flanders (Belgium)
Making remediation more green and sustainable

Through: Guidelines and assessment framework

- Adjustment of MCA: CO2-calculator (global effects), non-recyclable waste
- Focus on green technology in standard procedures
- Evaluation of sustainability indicators (SURF-UK)

Through: Facilitation and stimulation

- Pilot projects: demonstration and application of green and sustainable technologies
- Pilot project: combination of groundwater energy and remediation
- Ex officio projects: stimulation of use of green technology
- Brownfield projects: optimal integration between soil remediation and redevelopment

Austria: envisaged regulatory amendements

2012: DRAFT Contaminated Site Remediation Act

- **financing remediation of seriously contaminated site**
- **systematic approach for identifying contaminated and seriously contaminated sites, monitoring and remediation priorities**

***Remediation: a flexible and adaptive system* by**

- **tiered approaches**
- **"remediation target" (descriptive!!) and**
- subsequently (less important) "remediation target values"
- **principles to gain "sustainability" (no metrics!)**

How to improve our policy framing!

- Clarify objectives and build commitment
- Amend regulatory background
- Set/change incentives
- Provide information and tools

How to improve decisions and actions!

- valid information - sound conceptual model
- take a participatory approach at the design stage
- **Implementation:**
  - **adaptive (document and analyse your data!)**
  - **transparent (report to prove the difference in environmental and social impacts!)**
- ***Celebrate!***

Rating Systems – Why not for Remediation?

Using eco-efficiency for criteria and metrics

GreenBuilding-Certificate

- 880 kW – 1/3 heat supply
- Energy consumption – 40 %
- 85 t CO_2 /year

SURF US

- Survey of rating systems
- White Paper

Project Energy Index (SCHRENK, V., 2005) = total energy consumption of a remediation project normalised against a reference scenario (e.g. theoretical thermal treatment)

THANKS FOR YOUR ATTENTION!

ADDITIONAL FOOD FOR THOUGHTS

"What is called justice, is as arbitrary like fashion" **(Voltaire)**

Sustainable remediation seeks transparency on objectives & action