



COCOON
Interreg Europe



European Union
European Regional
Development Fund

Developing new policies on Landfill Management

Lleida, 25 October 2017

Eddy P.H. Wille, senior advisor OVAM

Interreg Europe: activities

Phase 1 : interregional learning (2017-2019)

- exchange of experience among project partners
- elaborating a regional action plan (at the end of phase 1) = implementation of the lessons learnt to improve the policy instrument within this region.
- Involvement of regional stakeholders!

Phase 2: monitoring of the action plans (2020-2021)

- Monitoring the action plans being implemented



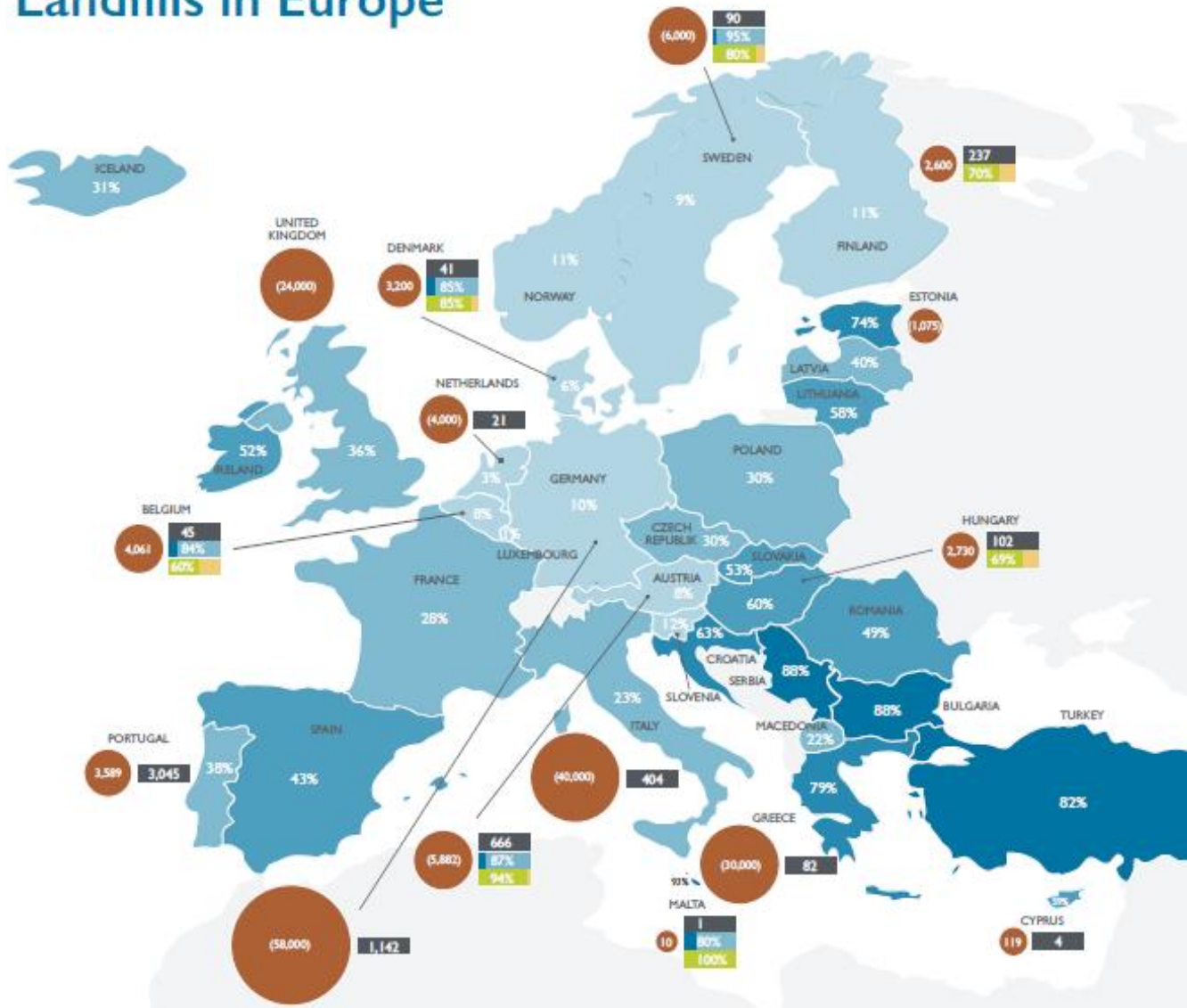
Eddy Wille, OVAM
4TH ELFM CONFERENCE
5,6 FEBRUARY 2017

Lleida , 25 October 2017



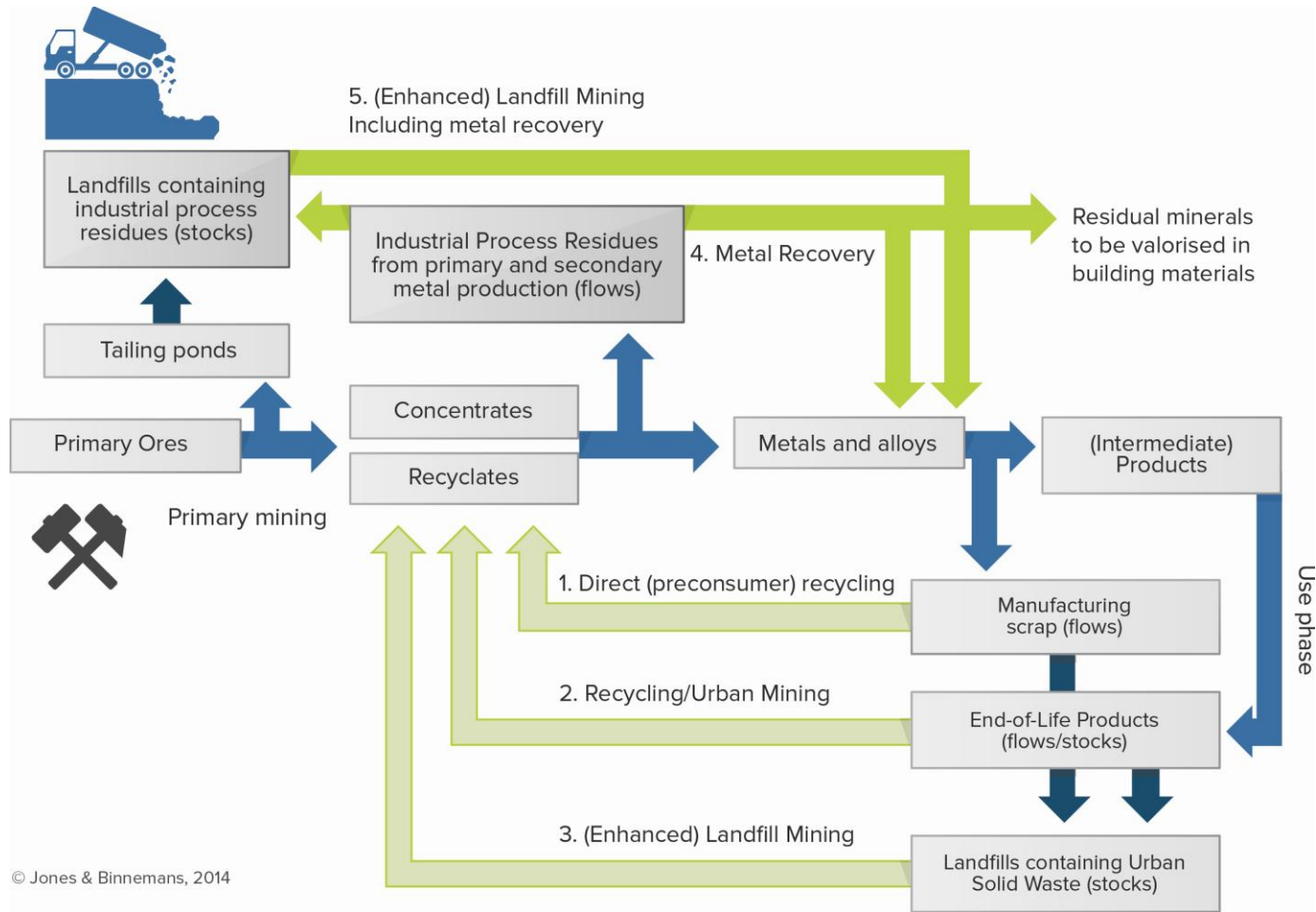
Landfills in the EU

Landfills in Europe



No exact figures,
only estimations :
150.000 – 500.000

(Enhanced) Landfill Mining within a broader Recycling strategy



Mission. To be a an **open, quadruple helix network** that supports the required **technological, legal, social, economic, environmental and organisational** innovation with respect to Enhanced Landfill Mining within the context of a transition to a **circular, low carbon economy.**



COCOON some background (1)

- **EURELCO consortium (established in 2014)**
 - NEW-MINE (Marie-Curie training network) for academia and companies
 - Interreg Europe for governments – policy of ELFM/LfM

- **Consortium for a Coherent European Landfill Management and Mining**
 - Submitted 31/7/2015
 - Focus on ELFM² (enhanced landfill management and mining)
 - But: too innovative, no chance of learning from each other, so we just didn't make it!

COCOON some background (2)

European Parliament (EP) event Oktober 2015

- 3 facts on landfills
 1. EC has no detailed data on landfill situation in EU
Eurelco screening shows that 90% of former LF are not in line with the LF directive of 1999.
 2. EC has no figures on the potential remediation costs of landfills
 3. There is no EU funding for ELFM projects
- EP asks EURELCO to perform three tasks:
 1. To map the landfills and the landfill situation in EU
 2. To develop a vision on landfills
 3. To find new innovative technologies to deal with landfills and ELFM

COCOON some background (3)

Why should we pay attention to / be interested in landfills ?

- Case of Flanders (Belgium)
 1. Inventory of landfills (2017)
 - 2226 landfills;
 - 2198 closed landfills (3/4 closed before 1984);
 - 28 operational landfills (1 % MSW landfilled)
 2. Monitoring and aftercare
 - First legal steps : 1985;
 - Since 2000 : monitoring period 30 years (before : 10)
 - Old landfills : Soil Remediation Act ; no specific long term management in place
 3. Trends, challenges and opportunities :
 - Circular economy;
 - Sustainable land use;
 - Climate adaptation;
 - Biodiversity;
 - Drinking water protection;
 - ...

Frameworks and trends

Global megatrends are large-scale, high impact and often interdependent social, economic, political, environmental or technological changes. Europe is bound to the rest of the world through multiple systems. This means that global megatrends will significantly affect Europe's ecological and societal resilience and its response options. As the global middle class expands, the total environmental burden could move beyond globally sustainable limits. 'Business as usual' will not be a viable development path for Europe.

Global Megatrend 11 : Diversifying approaches to governance.

- ▶ Introducing an integrated approach
- ▶ Increasing coordination of governance
- ▶ Avoiding competition between actors/policies
- ▶ Decoupling growth and impact
- ▶ Enhancing resource efficiency
- ▶ Promoting Biodiversity and Green cities
- ▶ Improving Mobility (walkable cities)
- ▶ Increasing Transparency and Environmental justice



Environment policy priority areas

- Climate change
- Nature and biodiversity
- Natural resources and waste
- Environment, health and quality of life

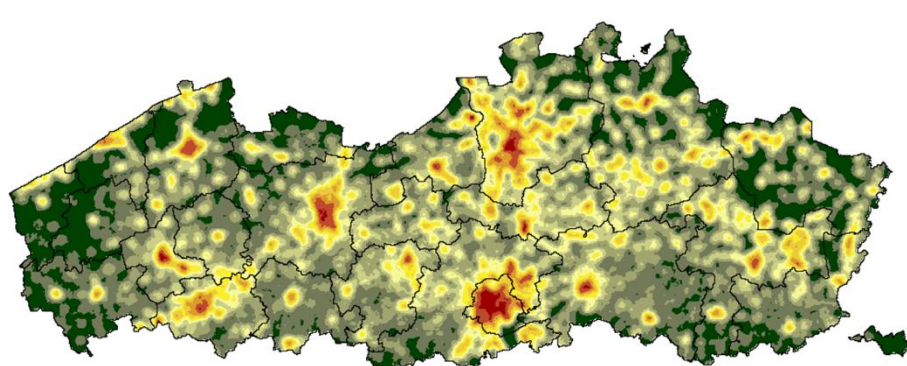
"In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, **circular economy** where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience. Our **low-carbon growth has long been decoupled from resource use**, setting the pace for a **safe and sustainable global society**."



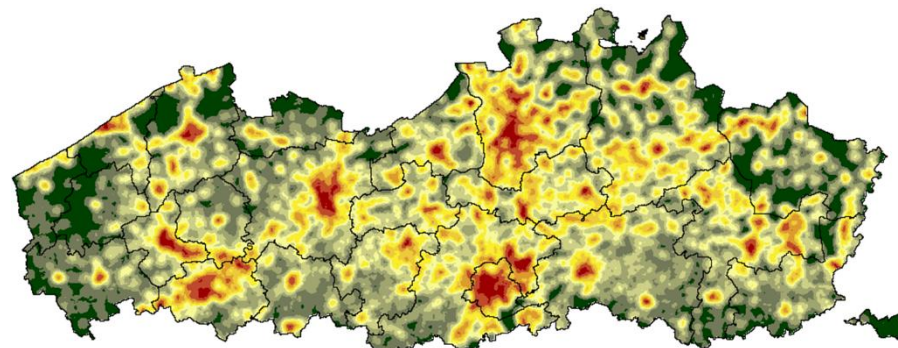
7th Environment Action Programme

Frameworks and trends

Land use



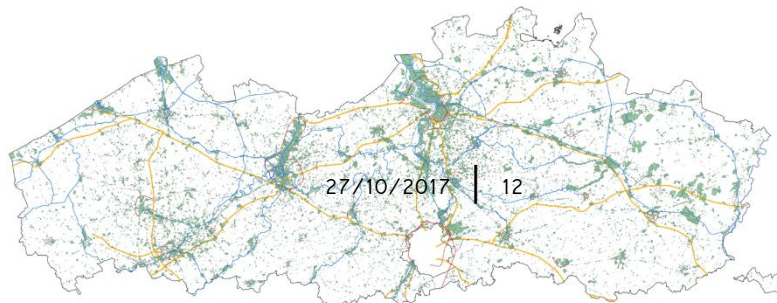
2010



2050

Increase of urban areas in Flanders: in total 7 ha/day; 5 ha/day transformed in residential landuse. Simulation made by Vito for the period 2010 – 2050 shows the impact of urbanisation in Flanders. According to the Planning Agency: population will rise significantly and assessments indicate the need of over 630.000 new dwellings by 2050.

'Ageing cities' is not limited to its inhabitants; infrastructure also requires retrofitting to become more sustainable and ready for the future.

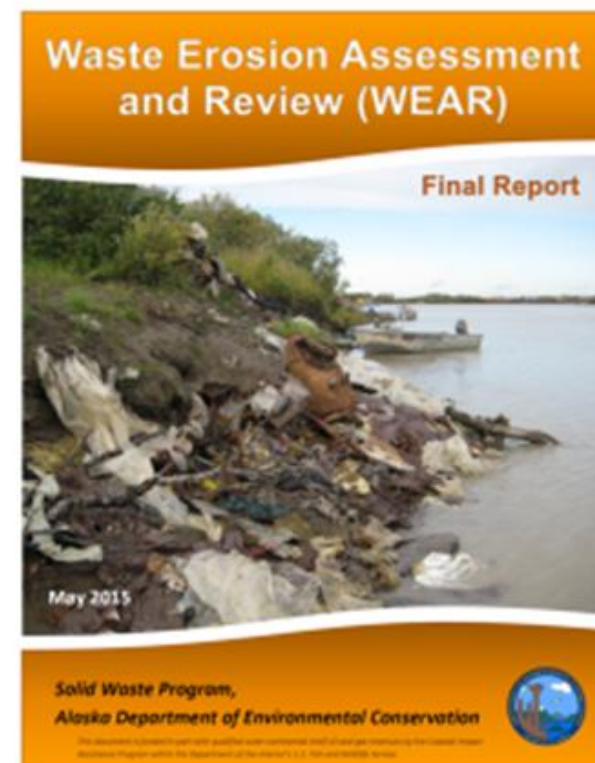
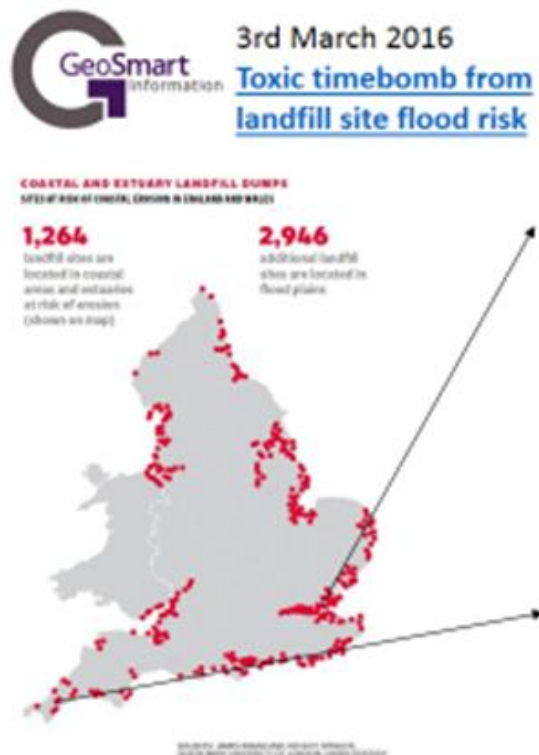


Frameworks and trends

Climate

Climate change, erosion and degradation : eternity is limited to a few decades !

Do not underestimate nature : respect !



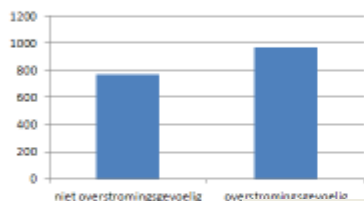
Frameworks and trends

Climate

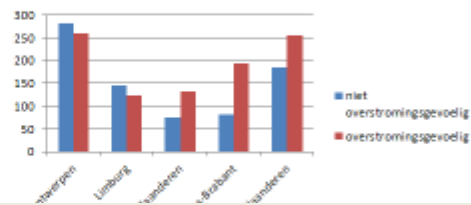
LANDFILLS IN AREAS VULNERABLE TO FLOODING

Vulnerability = potential or proven vulnerability to flooding

Number of landfills



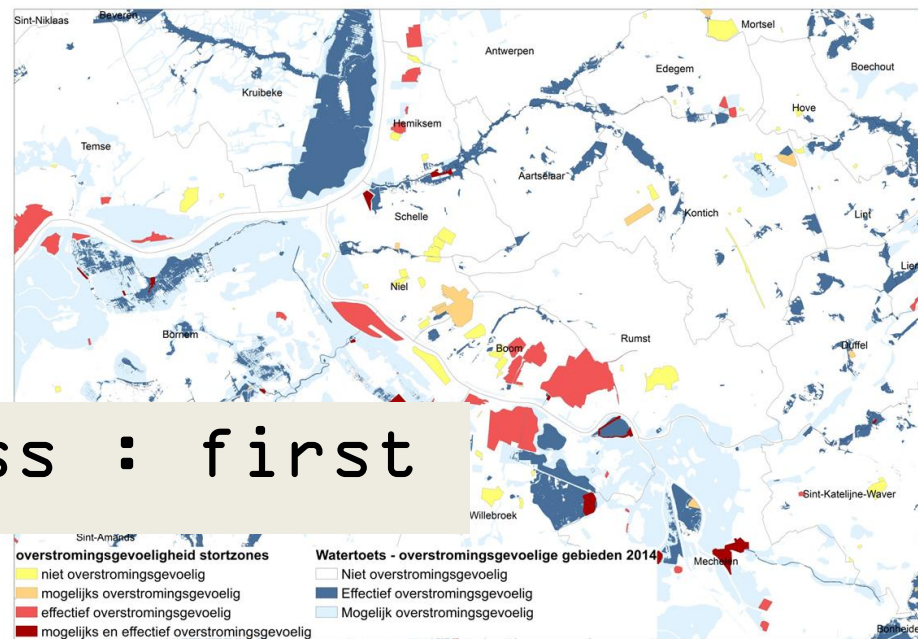
Location (provinces)



gebied	aantal stortplaatsen
niet overstromingsgevoelig	750
overstromingsgevoelig	950
Totaal	1700

Work in progress : first estimations

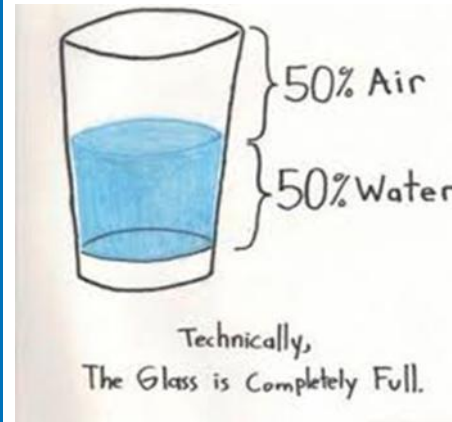
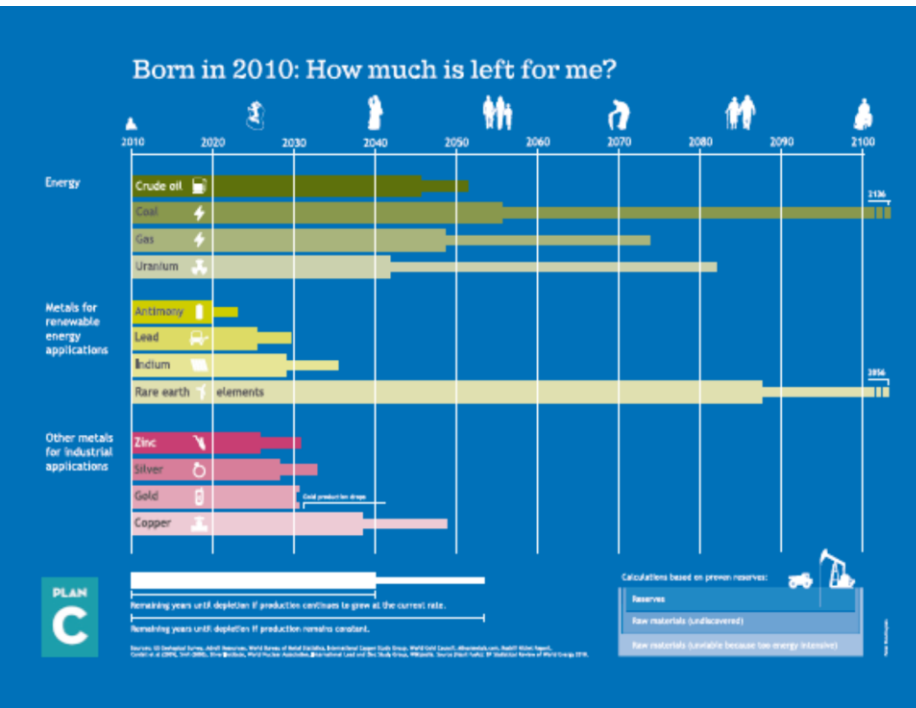
Antwerpen	250	250
Limburg	150	120
Vlaanderen	100	150
Brabant	100	200
Vlaanderen	180	250



High potential to flooding of former landfill sites (approx. 55 %).

Frameworks and trends

Resources

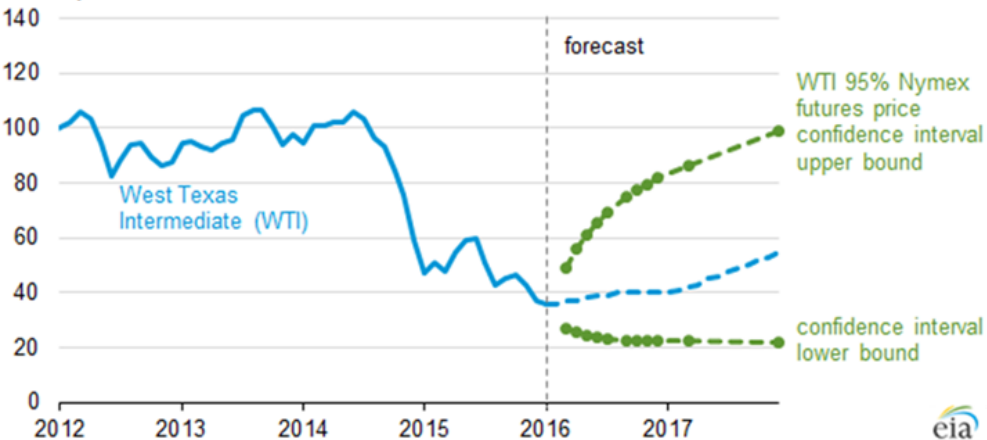


Scarcity : demand versus supply
Depletion or lower grade ?

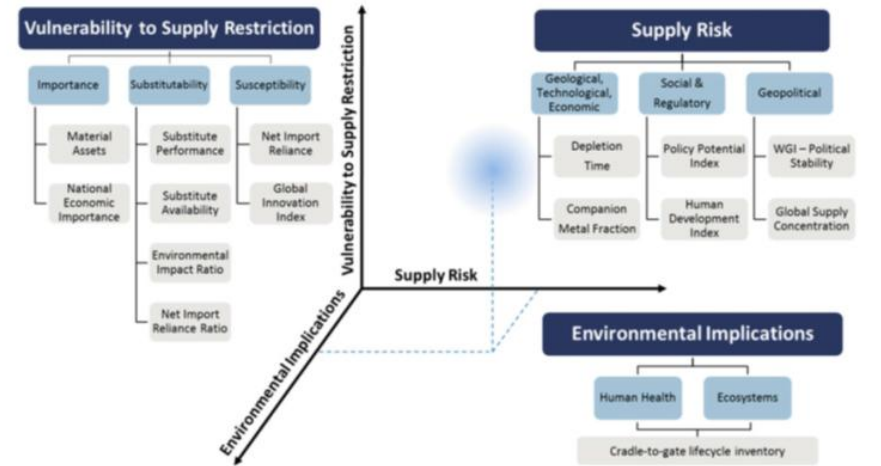
Frameworks and trends

Resources

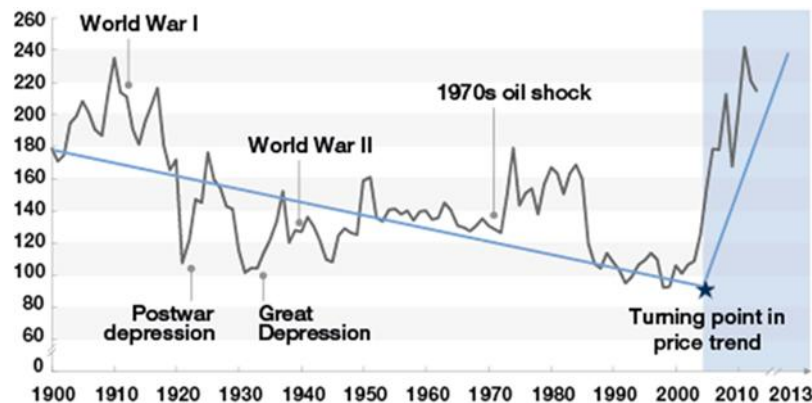
West Texas Intermediate crude oil price and Nymex confidence intervals (2012-17)
dollars per barrel



eia



Material criticality : geological, technological and economic components of supply risk (Graedel)



19/07/2016

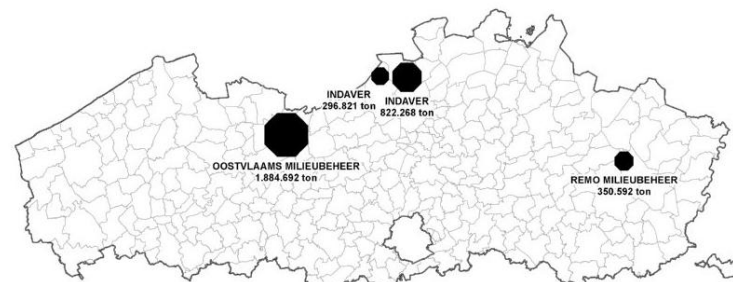


Waste management and landfills in Flanders

Number of landfills		
	1985	2012
Cat 1 (Hazardous waste)	11	4
Cat 2 (Non-hazardous waste)	34	9
Cat 3 (Inert waste)	73	4



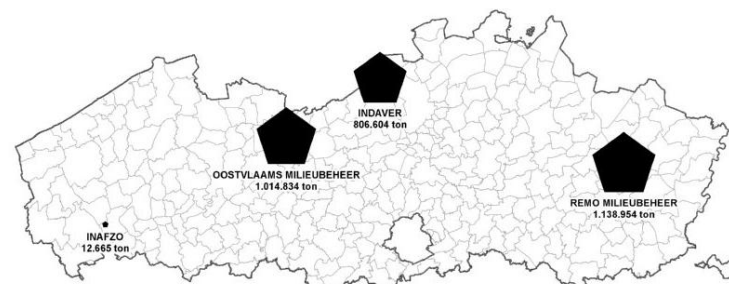
Cat. 3



Cat. 1

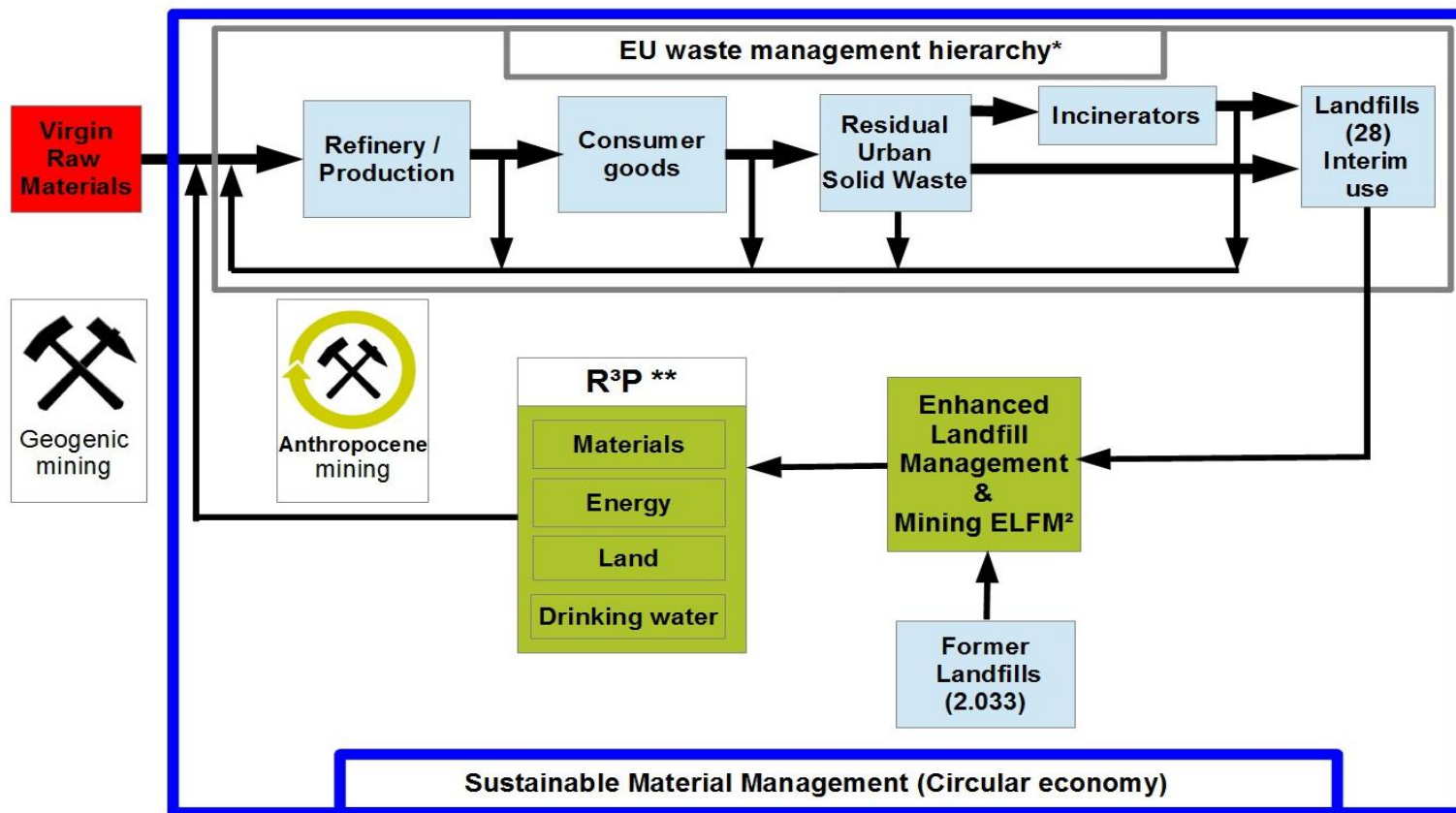


Cat. 2 - MSW



Cat. 2 - industrial **OVAM**

Enhanced Landfill Mining (ELFM)



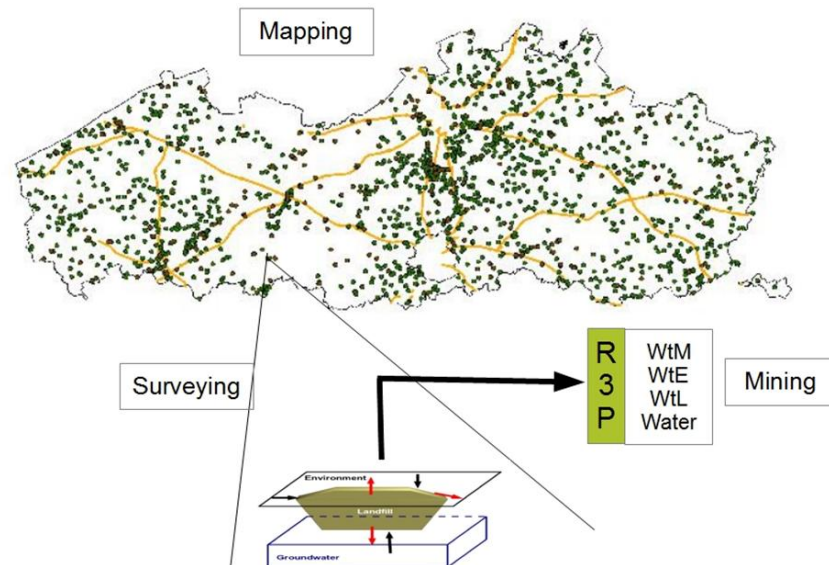
*Prevention (Ecodesign, dematerialisation,...), Reuse/ Recycling, Incineration, Landfilling (EU Waste Framework Directive)

** R³P = Recycling of Materials, Recovery of Energy, Reclaiming of Land, Preserving Drinking water supplies

ELFM – Policy making

OVAM's Action plan on ELFM:

- decision board of directors: dec 2011;
- programme 2012-2015;
- basic principles: Mapping-Surveying-Mining;
- reintroducing Landfills in circular economy;
- developing innovative concepts;
- supporting innovative technologies;
- study on economic and legal aspects;

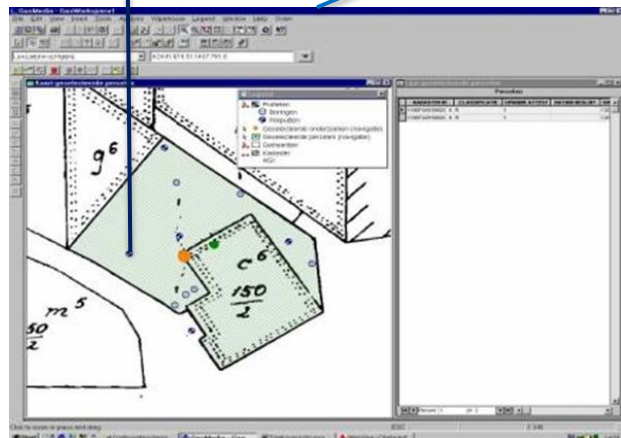


ICMA SmartBrief

ICMA
Leaders at the Core of Better Communities

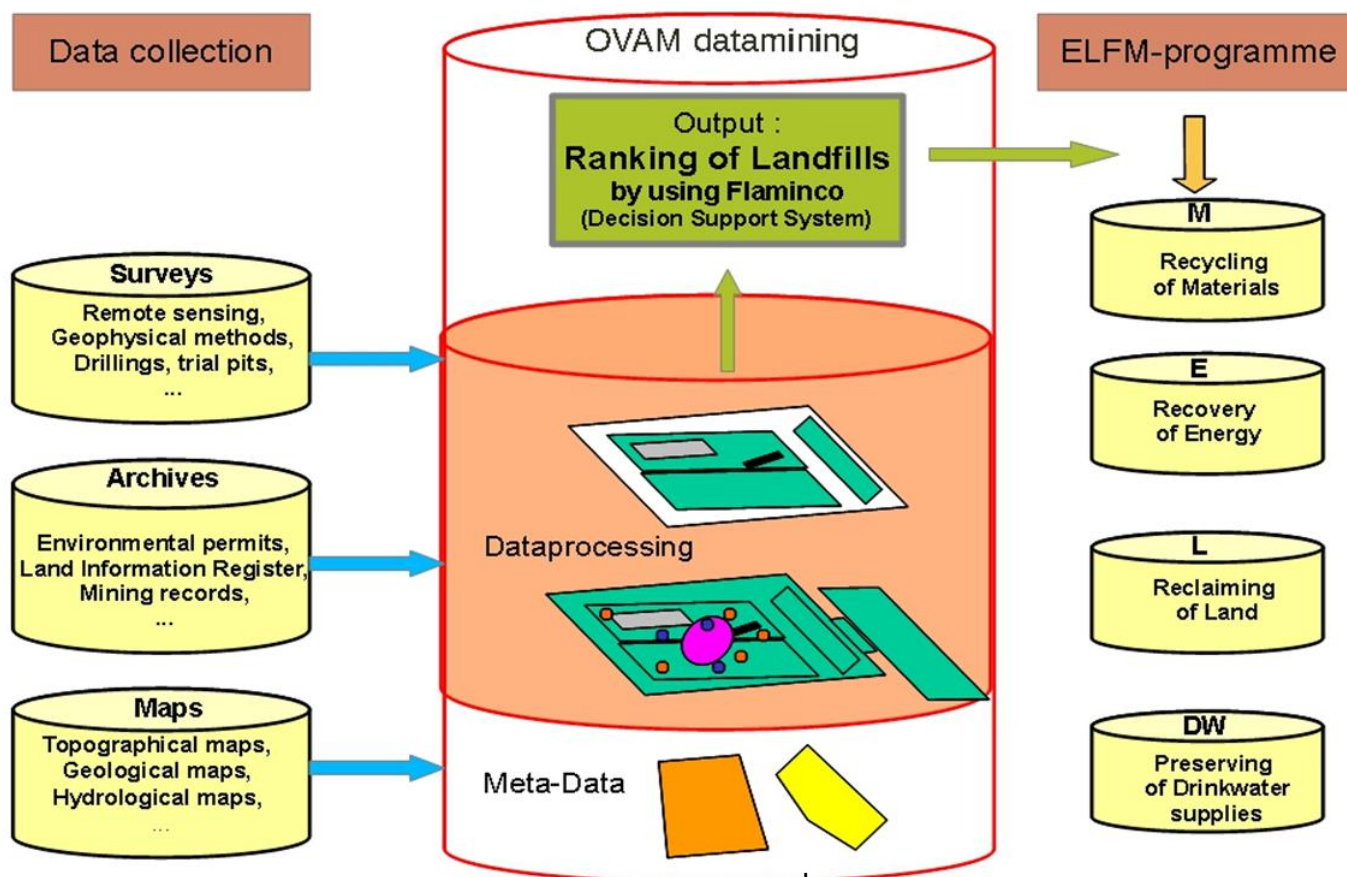
Economic Development, Restoration and Sustainability Wash. city hopes to convert defunct landfill into parkland.

The city of Bellevue, Wash., is moving ahead with plans for transforming a long-closed landfill into Bellevue Airfield Park. Plans include covering the landfill and its methane-extraction system.



OVAM

ELFM – Data & decision making



State of the Art

27/10/2017 | 21

ETHER WE
TOMORROW
IS BEAUTIFUL

OVAM

ELFM – Data & decision making

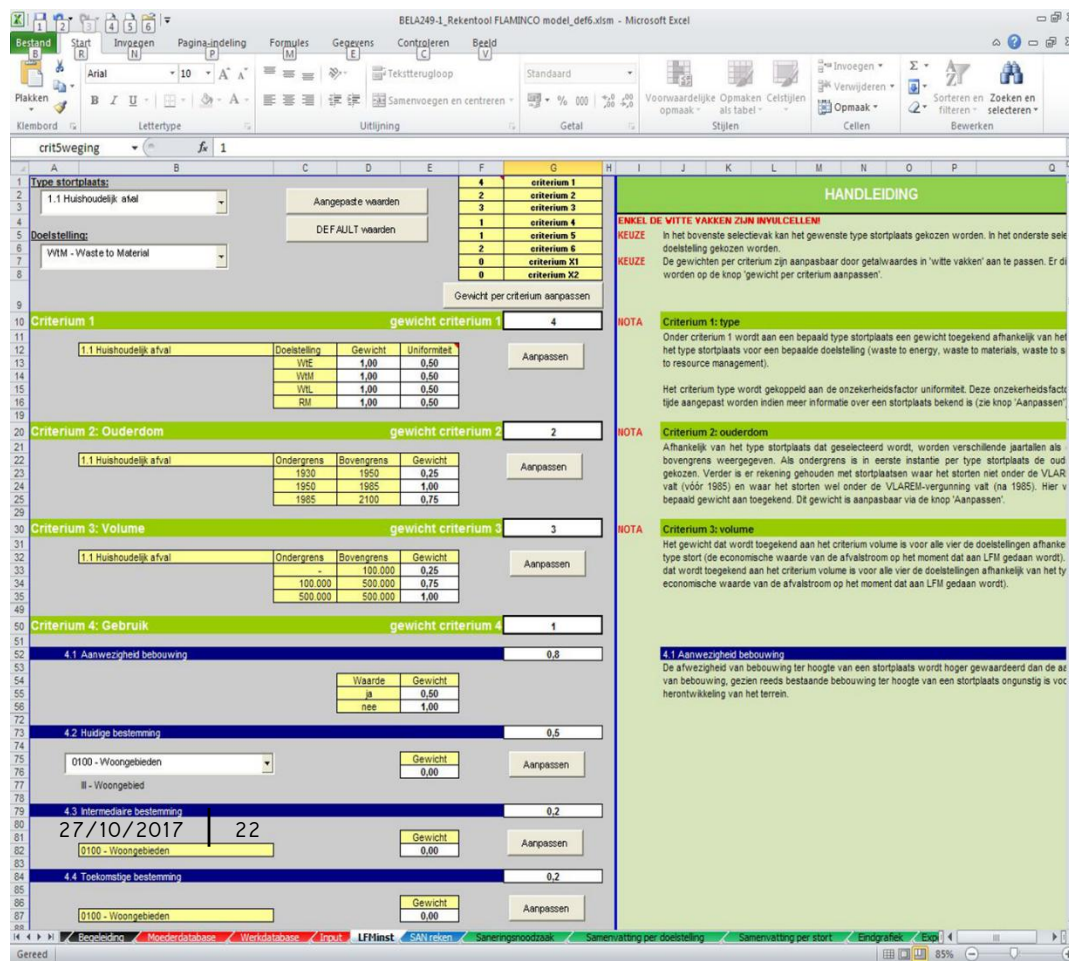
Flaminco:
decision support system to manage
landfills in a sustainable way.

2 main components:

- Mining potential;
- Potential environmental impact.

6 criteria to determine EFLM-potential:

- Type of landfill
- Period of landfilling
- Volume of landfill
- Land use of landfill
- Distance to transport modi (roads, waterway, railway)
- Proximity of other landfills



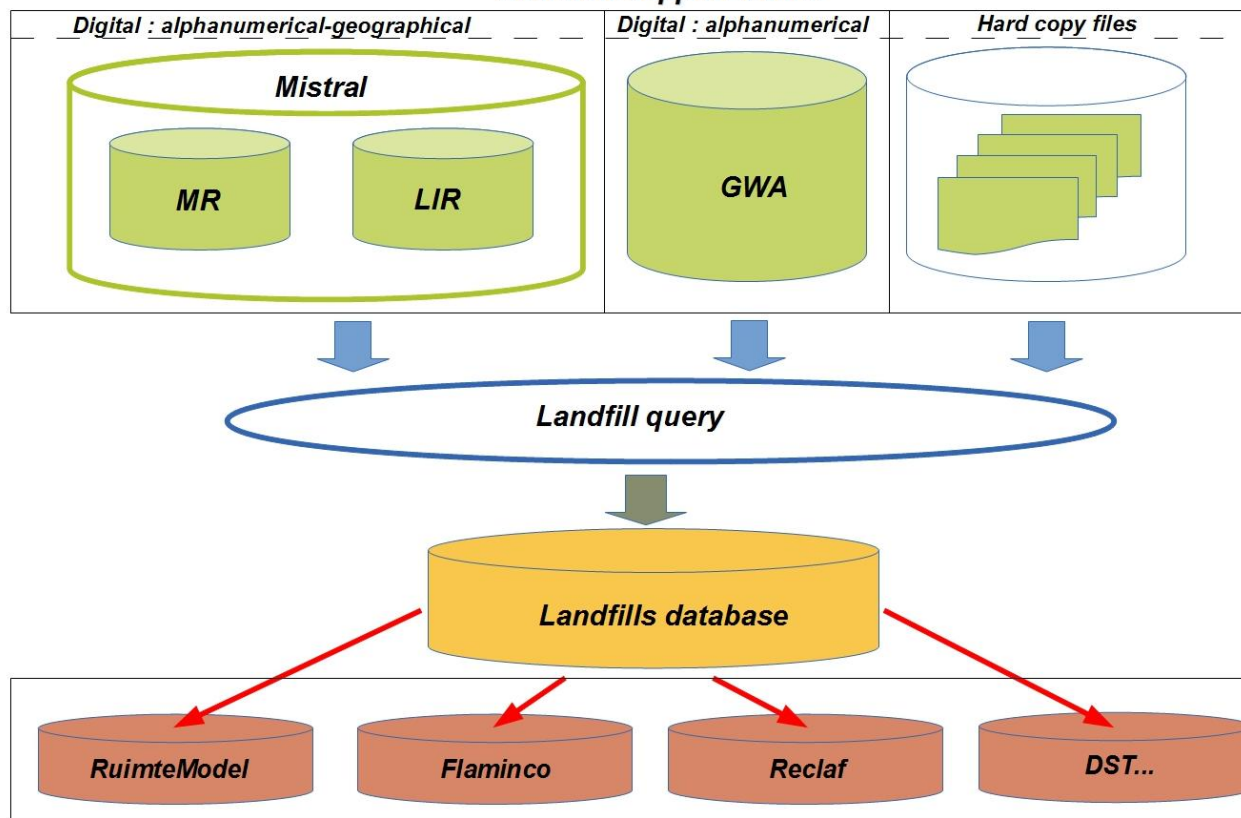
The screenshot shows the ELFM decision support system interface in Microsoft Excel. The interface is divided into several sections:

- Type stortplaats:** A dropdown menu showing '1.1 Huishoudelijk afval' (Household waste).
- Doelstelling:** A dropdown menu showing 'WtM - Waste to Material'.
- Criteria:** A section with four criteria, each with a table of 'Gewicht' (Weight) and 'Uniformiteit' (Uniformity) values.
 - Criterium 1:** 'gewicht criterium 1' is 4. The table shows values for 'WtM', 'WtL', and 'RM'.
 - Criterium 2:** 'gewicht criterium 2' is 2. The table shows values for 'Ondergrens', 'Bovengrens', and 'Gewicht'.
 - Criterium 3:** 'gewicht criterium 3' is 3. The table shows values for 'Ondergrens', 'Bovengrens', and 'Gewicht'.
 - Criterium 4:** 'gewicht criterium 4' is 1. The table shows values for 'Waarde' and 'Gewicht'.
- Handleiding:** A section on the right providing detailed instructions for each criterion.

The interface is in Dutch and includes a 'HANDLEIDING' (Guidance) tab on the right. The bottom of the screen shows the Excel status bar with 'Gereed' (Ready) and a zoom level of 85%.

Enhanced Landfill Management & Mining (ELFM²)

OVAM-data on landfills: accessibility and availability for Decision Support Tools.



MR=Municipal Register; LIR=Land Information Register; GWA=General Waste Archives; LF= Landfill Archives

Enhanced Landfill Management & Mining (ELFM²)

ITRC. Use of risk assessments in Management of contaminated sites (2008).

'(...) the premise of protecting human health and the environment from **emissions**, discharges, or releases of pollutants.

(...) development of **risk** information to determine whether a removal action and/or remedial actions is necessary, or (...) no further action.

(...) a sufficient data set is required to **delineate the fate and transport of contaminants** and the type and nature of contaminant **exposure**.'

Conceptual Site Model (CSM) and ELFM² :

- ▶ More focus on composition of landfill;
- ▶ Mutual impacts : landfill and its environment (physical, societal, economic, ...);
- ▶ Static versus Dynamic system;
- ▶ Interim use;
- ▶ Opportunities and added value;

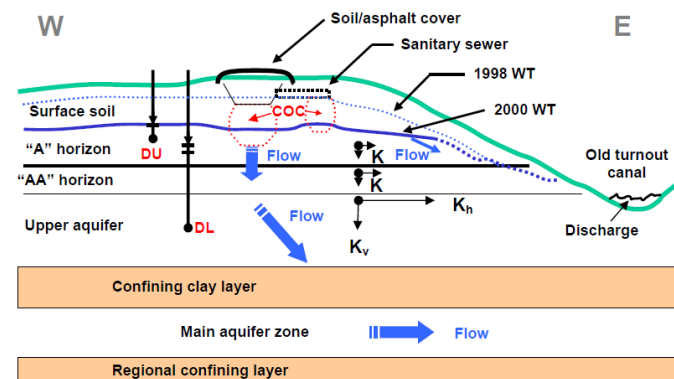
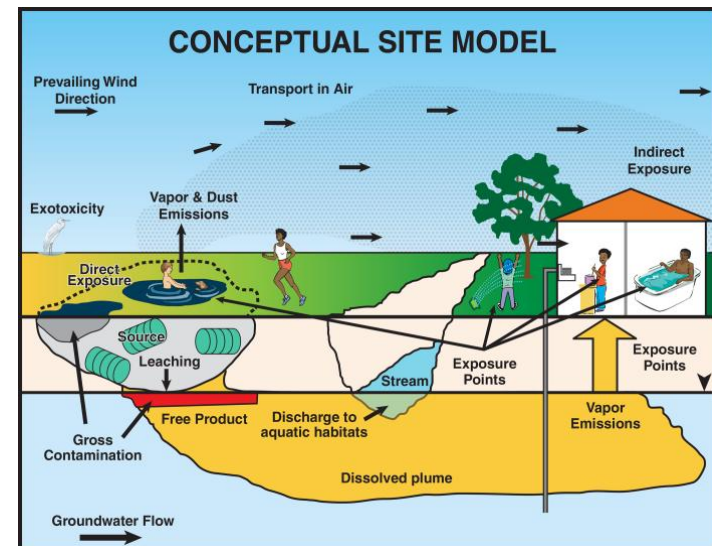


Figure 3-1. Initial conceptual site model showing a confining layer between two aquifers.

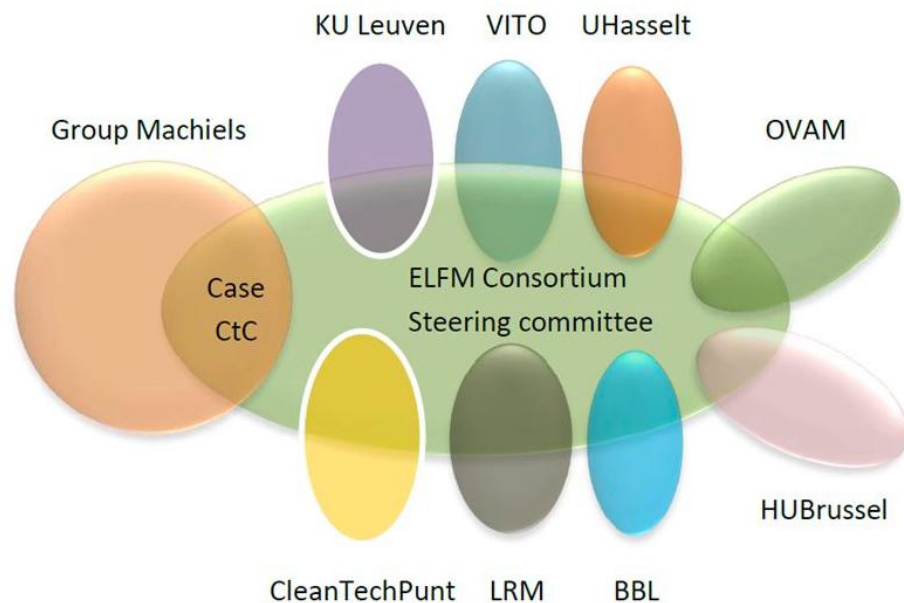
Cocoon-objectives

Stakeholder involvement

First step (2008): Stakeholder group formed on the specific case of the Remo landfill at Houthalen (B): IWT-funded project Closing the Circle (CTC).

Basic principles of Multi Actor Governance at CTC:

- Introducing the Quadruple helix (Peter Tom Jones).
- Defining objectives, engagements and roles.
- Avoiding false expectations (there no such thing as a free lunch).





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Project smedia