

# **Landfill mining som koncept – et overblik over hvad der sker i EU lige nu**

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**DAKOFA Seminar - Er lossepladserne og deponierne fremtidens guldminer?**

**17. maj 2017 Renosyd, Skanderborg**



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Waste - Resources - Environment

# Landfill mining and reclamation (LFMR)

Is a process whereby solid waste which have previously been landfilled are excavated and processed. The function of landfill mining is to reduce the amount of landfill mass encapsulated within the closed landfill and/or temporarily remove hazardous material to allow protective measures to be taken before the landfill mass is replaced. In the process, mining recovers valuable recyclable materials, a combustible fraction, soil, and landfill space. The aeration of the landfill soil is a secondary benefit regarding the landfill's future use. The combustible fraction is useful for the generation of power. The overall appearance of the landfill mining procedure is a sequence of processing machines laid out in a functional conveyor system. The operating principle is to excavate, sieve and sort the landfill material.

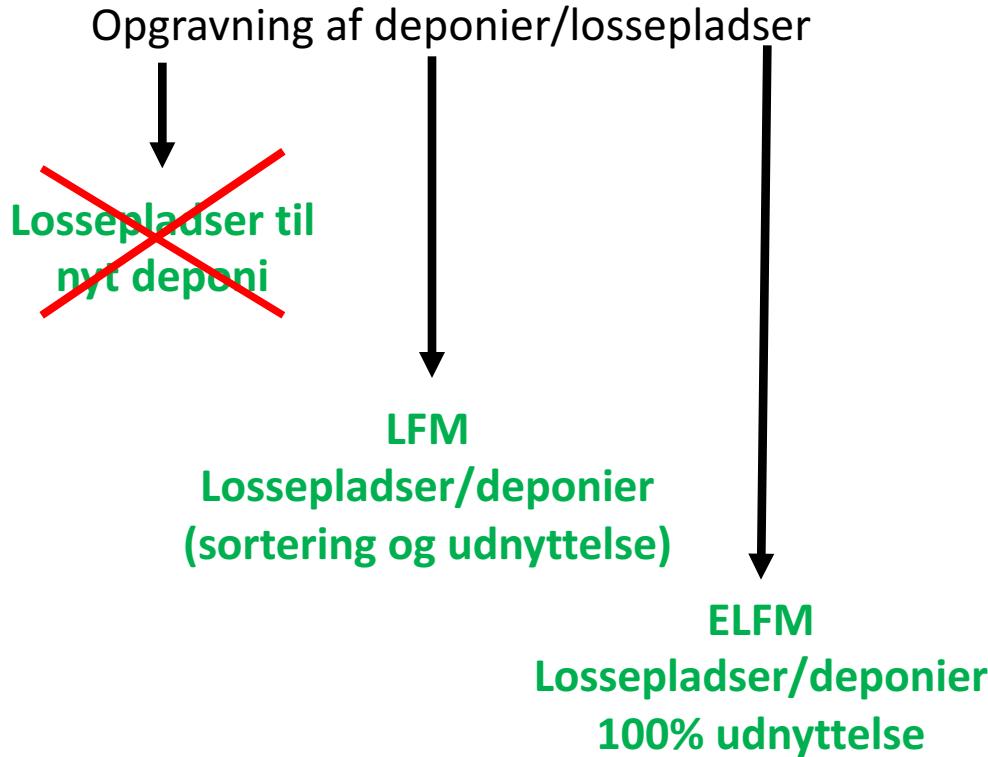


# Formålet

- Oprensning
- Ny kapacitet
- Byudvikling
- Efterbehandlings usikkerhed og omkostninger
- Ressourcer (Sekundært mål)

Review af 39 projekter (J. Krook et. al)

# LFM som koncept



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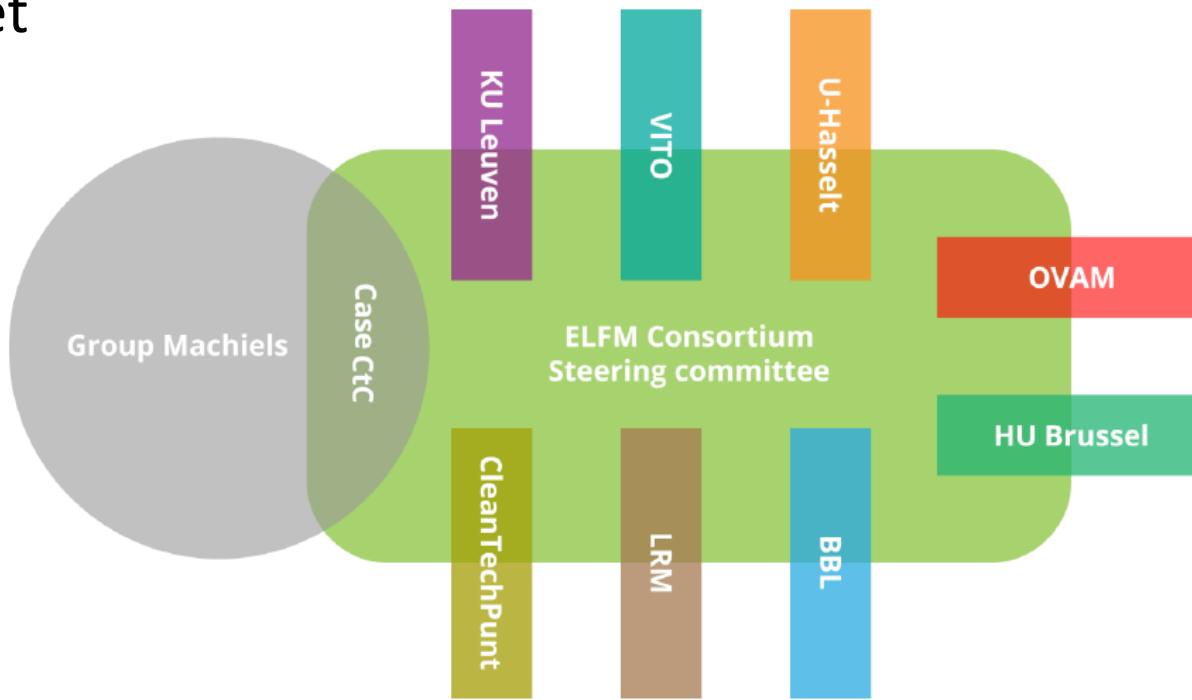
# Gennemførte projekter EU

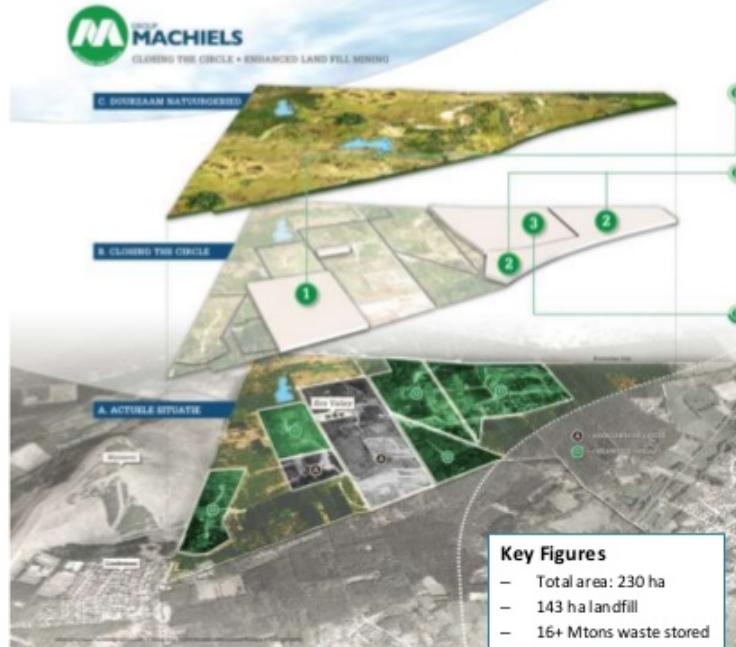
- Første projekter fra start 90erne
- Sverige, Danmark, Belgien, Tyskland, Østrig, Finland, Estonien, UK, Portugal, Holland
- Alene tale om pilot eller demonstrationsprojekter – ingen fuld skala endnu.
- Fra midten af 00erne og frem er der sket en stigende interesse



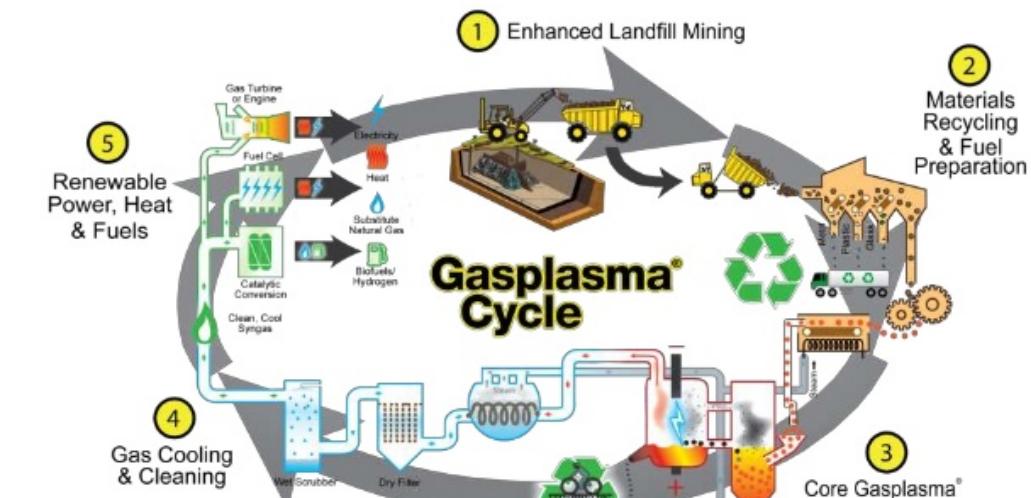
# ELFM consortium Flanders

- 2008 afholdes den 1ste ELFm konference i Belgien
- Startskud til oprettelsen af ELFm Consortium i Belgien
- Bygget op om "Remo Landfill Case" Closing the Circle projektet





## Enhanced Landfill Mining ELF M



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# EURELCO

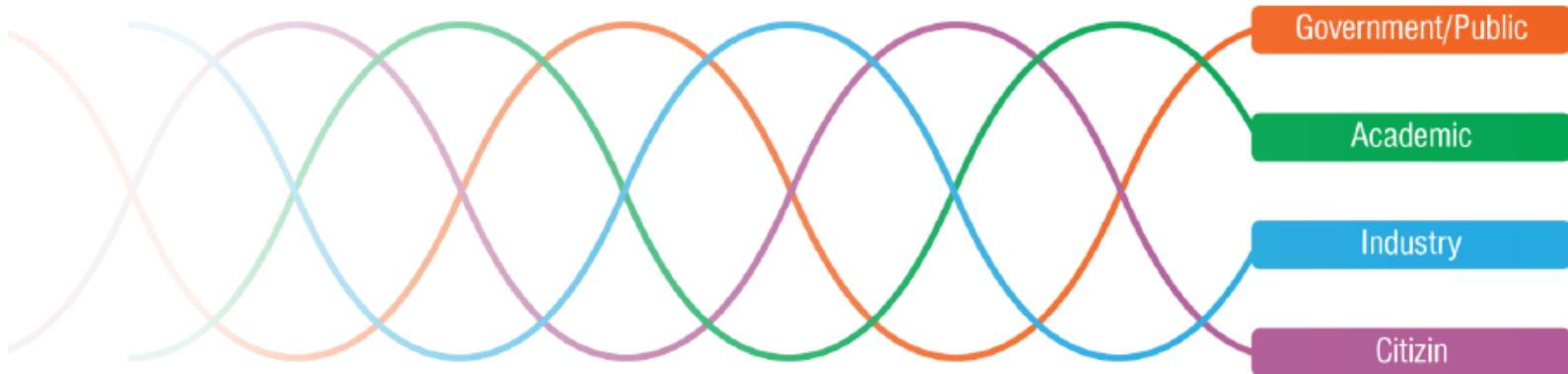
- 2014 afholdes ELFM II konference i Belgien
- Startskud til EURELCO - EUROPEAN ENHANCED LANDFILL MINING CONSORTIUM

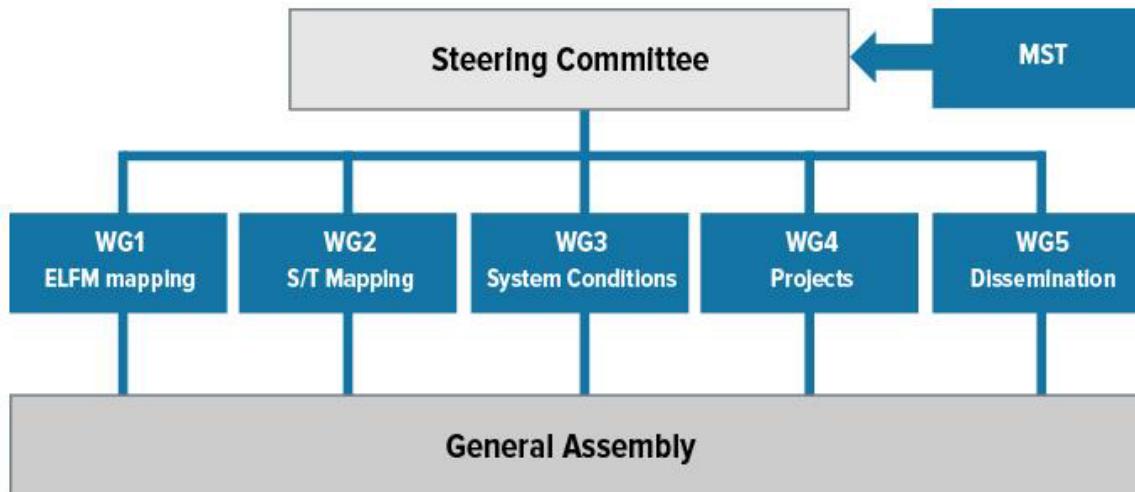


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# EURELCO

- Åbent quadruble Helix netværk
- Lovgivning, økonomiske, sociale og tekniske barrierer (lobby)
- Bygger på samarbejde og vidensdeling





- WG 1 - kortlægning af og indsamling af eksisterende LFM projekter på EU samt nationalt niveau
- WG 2 - Beskrivelse og indhentning af forskning og metodikker indenfor LFM
- WG 3 - Juridiske og lovgivningsmæssige barrierer på EU samt nationalt niveau
- WG 4 - Koordinering af fælles EU projekter og ansøgninger
- WG 5 - Kommunikation

Et af målene i EURELCO er, at alle medlemslandene på sigt opretter nationale konsortier.



# 58 partners in 13 EU countries



## LEGEND ■ = 1 MEMBER

AUSTRIA



ICELAND

BELGIUM



DENMARK



ESTONIA



FINLAND



GERMANY



GREECE



ITALY



PORTUGAL



SPAIN



SWEDEN



THE NETHERLANDS



UK



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# LANDFILLS IN EUROPE

## Legend



Amount of presently still operational landfills



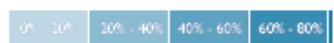
Distribution sanitary landfills (preceding and/or in compliance with EU landfill directive) / non sanitary landfills (in % of landfill)



Distribution USW/Industrial landfills (in % of landfills, in tons not weights)

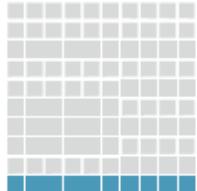


Estimated total amount of landfills (when data are indicated between brackets) this implies it is an estimate based on the amount of municipalities multiplied by an average amount of 1 landfill per municipality



Current landfill rate(%) i.e. share of landfilled waste versus to generated, excluding major mineral waste (EUROSTAT 2012)

EU(28): 500,000+ landfills



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# EU FUNDED LANDFILL MINING PROJECTS



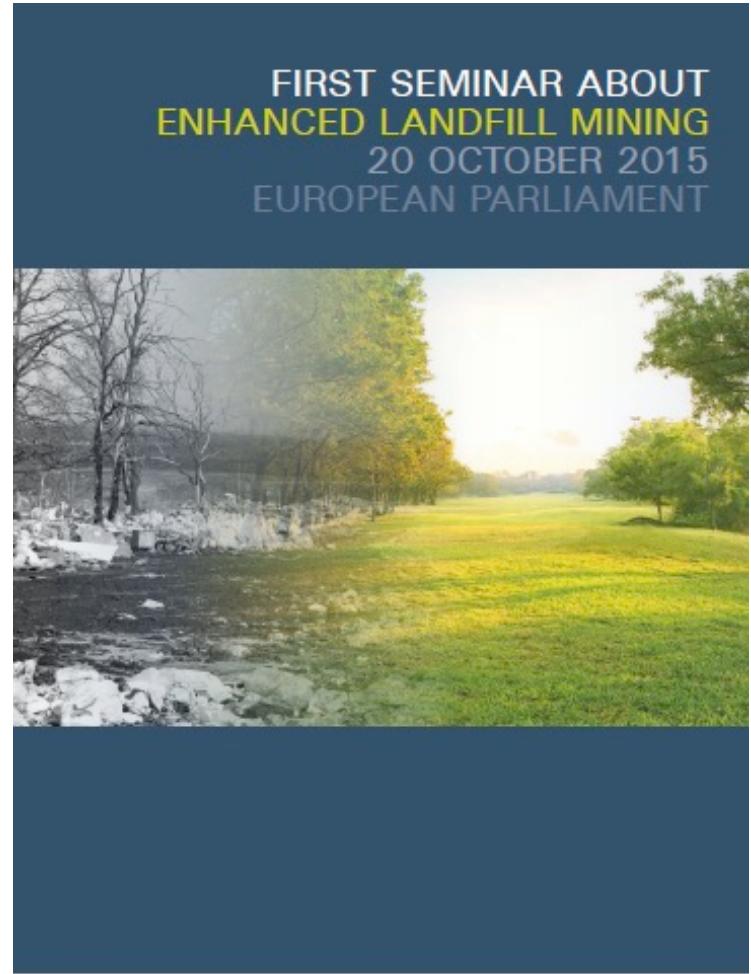
COCOON is the first European project on policy of Landfill Management (LfM). The COCOON partners will improve regional policy on LfM in 6 regions, starting from existing regional legislation, and learn from the best practices and lessons learned in the other regions. Working with a regional stakeholder group on the development of the policy will enhance the implementation of the policy



SMART GROUND will address the issues of waste management and resource recovery, reducing EU dependence on raw materials while contributing to secure its sustainable supplies, in accordance with the Strategic Implementation Plan of the EIP. In particular the following impacts will be achieved: Better-informed decision making at EU and National level; Improved availability of key Raw Materials, while creating added value to the economy and more jobs, thus facilitating the use of the most advanced, economically effective and innovative technologies in the whole value chain, in order to spread the EU circular economy.

However, the widespread adoption of Enhanced Landfill Mining (ELFM) in the EU, as envisaged by NEW-MINE, urgently requires skilled scientists, engineers, economists and policy makers who can develop cost-effective, environmentally friendly ELFM practices and regulatory frameworks. All this demands a European commitment to concerted, inter- and transdisciplinary research and innovation. NEW-MINE trains 15 early-stage researchers (ESRs) in all aspects of landfill mining, in terms of both technological innovation and multi-criteria assessments. The technological innovation follows a value-chain approach, from advanced landfill exploration, mechanical processing, plasma/solar/hybrid thermochemical conversion and upcycling, while the multi-criteria assessment methods allow to compare combined resource-recovery/remediation ELFM methods with the “Do-Nothing”, “Classic remediation” and “Classic landfill mining with (co-)incineration” scenarios. By training the ESRs in scientific, technical and soft skills, they become highly sought-after scientists and engineers for the rapidly emerging landfill-mining and broader raw-materials industries of Europe.





# PARLIAMENTARY QUESTION ON ELF M

- Europe consists of a vast, untapped potential of material stocks in 150,000 to 500,000 historic and still active landfills in the EU-28. In view of the development of a new circular economy package and the potential role of Enhanced Landfill Mining in this package, further consideration should be given to the following issues:
- Many landfills pose major environmental and human health risks if left unaddressed. Member States will have to use taxpayers' money to remediate the most problematic sites. Has the Commission performed any calculations on the future remediation costs for the EU-28?
- Contrastingly, the EU's landfills contain significant amounts of base and critical metals, minerals, energy carriers etc. which can be recovered. Has the Commission performed a mapping of the resource potential of its 150,000 to 500,000 landfills?
- To be cost-effective for private companies, Enhanced Landfill Mining requires cutting-edge separation, transformation and upcycling technologies to deliver metals, materials, energy carriers and land. Does the Commission plan to support R&D and/or pilot activities, as well as demonstration projects, which explicitly address Enhanced Landfill Mining?

EUROPEAN PARLIAMENT  
FORM FOR TABLING A QUESTION FOR  
WRITTEN ANSWER (RQ#120)  
EN

Select only one addressee:	<input type="checkbox"/> COUNCIL	<input type="checkbox"/> COMMISSION
PRESIDENT OF THE EUROPEAN COUNCIL	<input type="checkbox"/>	<input type="checkbox"/>
VICE-PRESIDENT / HIGH REPRESENTATIVE	<input type="checkbox"/>	<input type="checkbox"/>
Priority question:	<input checked="" type="checkbox"/>	
AUTHOR(S):	Hilde VAUTMANS	
SUBJECT:	Strikingly Enhanced Landfill Mining: impact of the landfill to circular economy	
Text: Dear Sir or Madam, your budget proposal allocated €150,000 - 500,000 historic and still active landfills in the EU-28. In view of the development of a new circular economy package and the potential role of Enhanced Landfill Mining in this package, further consideration should be given to the following. Address to Member States and the public sector major environmental and landfill health risks? It is understood, Member States will have to use taxpayers' money to remediate the most problematic sites. Has the Commission performed any calculations on the future remediation costs for the EU-28?  Consequently, the EU's landfills contain significant amounts of base and critical metals, minerals, energy carriers etc. which can be recovered. Has the Commission performed a mapping of the resource potential of its 150,000 to 500,000 landfills?  To be cost-effective for private companies, Enhanced Landfill Mining requires cutting-edge separation, transformation and upcycling technologies to deliver metals, materials, energy carriers and land. Does the Commission plan to support R&D and/or pilot activities, as well as demonstration projects, which explicitly address Enhanced Landfill Mining?		
Signature:		
Date: 18.05.2015		



# PARLIAMENTARY QUESTION ON ELFM

## - ANSWER

- In de EU bestaat een uitgebreid pakket regels, zoals de Richtlijnen 2008/98/EG betreffende afvalstoffen en 1999/31/EG betreffende het storten van afvalstoffen, die moeten garanderen dat de risico's voor het milieu en de volksgezondheid als gevolg van de exploitatie van stortplaatsen worden verminderd en vervolgens uitgesloten. Indien correct toegepast, moeten deze regels, in het bijzonder die betreffende de sluiting van stortplaatsen en nazorg, waarborgen dat alle negatieve gevolgen voor het milieu worden gemonitord en aangepakt. De bevoegde nationale autoriteiten moeten zorgen voor de correcte toepassing van deze regels. Tot op heden heeft de Commissie nog niet berekend wat de saneringskosten zullen zijn als gevolg van de exploitatie van stortplaatsen in de EU28. **[Or: the EC has no idea about the remediation costs!]**
- 
- Informatie over de verschillende afvalsoorten, de samenstelling ervan en de mogelijkheden om materialen op een economisch haalbare wijze uit stortplaatsen terug te winnen, zou in het kader van het EU-grondstoffeninitiatief bijzonder interessant zijn, maar momenteel wordt de Commissie hierover niet systematisch geïnformeerd. **[Or: the EC has no clue about the landfill situation in the EU-28!]**
- 
- De Commissie is niet van plan om zich in haar onderzoeks- en innovatieprogramma's in de nabije toekomst specifiek te richten op het op grotere schaal recupereren van stortplaatsmaterialen ("enhanced landfill mining"). Dergelijke projecten zijn al in aanmerking gekomen voor voorstellen in het kader van Horizon 2020 en dat zal ook zo blijven. Horizon 2020 bestrijkt een breder scala aan onderwerpen en moedigt maatregelen aan die aantonen dat de op een circulaire economie gerichte aanpak economisch en ecologisch haalbaar is en potentieel heeft om de herindustrialisering van de EU een krachtige impuls te geven. In het werkprogramma 2014-2015 is specifiek aandacht geschonken aan afval en recycling en het nieuwe werkprogramma 2016-2017 zal via brede oproepen voor grootschalige demonstratieprojecten een op een circulaire economie gerichte aanpak ondersteunen. **[No plans for ELFM calls yet]**
- PB L 312 van 22.11.2008./PB L 182 van 16.07.1999.

# Lovgivning

- Den 14. marts 2017 vedtog Europa-Parlamentet en række ændringsforslag til Europa-Kommissionens CØ-pakke.
- I den forbindelse lægger Parlamentets udspil op til, at Landfill Mining inkluderes i Deponeringsdirektivet.
- Parlamentet har tilføjet følgende paragraf om Landfill Mining i Artikel 5:

*“The Commission shall further examine the feasibility of proposing a regulatory framework for enhanced landfill mining so as to permit the retrieval of secondary raw materials that are present in existing landfills. By 31 December 2025 Member States shall map existing landfills and indicate their potential for enhanced landfill mining and share information.”*

